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ON THE BREEDING, REARING, FATTENING, AND GENERAL MANAGEMENT OF NEAT CATTLE.

[Continued from page 336 Vol. II.]

Of soiling neat cattle.

The advocates of this system support it by the following arguments, which certainly merit the closest attention of the grazier. That:

I. By introducing the practice of soiling, *a very considerable saving of land* will be effected; one acre of cut grass soiled being equal to three acres used as pasture; and one acre of cut clover being equal to two acres pastured, even of the same field, and sown with the same grass, the clover not being trampled upon, and growing so much faster than if it were often corroded with the teeth of an animal, or the young leaves nibbled off before they are sufficiently formed. It has even been affirmed that *sixteen* acres of cut clover and tares will feed as many horses and cattle as *thirty-six* acres of the same kind of grass would do, if used in pasturage;* and that as all plants draw much of their food from the atmosphere by means of their foliage, they are deprived of their chief support and never attain perfection, if the herbage be trodden before it has arrived at maturity.

II. There is also a very *considerable saving in the quantity of food consumed*, as well as a greater variety of plants eaten, and consequently prevented from running to waste: for when animals are suffered to go upon the field, many plants are necessarily trodden under foot and bruised, or partly buried in the earth; in which state they are greatly disrelished by cattle, and are suffered to run to waste; a circumstance which never could occur, if the practice of cutting were adopted.

And if the consumption of plants be the object principally regarded, it is obvious that the benefits thence to be derived will be very great; for experience has clearly proved, that cattle will eat with avidity many plants, *if cut and given to them in the house*, which they never would touch while growing in the field: such are the dock, cow-parsley, thistles, nettles, and numerous other plants; yet, on the other hand, it is known that they will eat food, *when thrown to them on the ground*, which they will reject when given in the stall. We confess, we know not to what circumstance this can be attributed; but the fact is, that the animals will eat them without exhibiting any marks of dislike or reluctance, even when they are not pressed by hunger; and they often greedily devour these plants as soon as they are brought in from the field, and before they can have possibly had time to become hungry. It is also well known that many of our best and finest grasses, which, when young, form a most palatable food to cattle, are, if once suffered to get into ear, so much disliked by them, that the beasts will never taste them unless compelled by extreme hunger. And as, in most pastures, many of these grasses ripen through delay, their produce is, of course, inevitably lost to the grazier; whereas, if cut down by the scythe in proper time, not one plant will be suffered to get into that nauseating state, and consequently no waste can be sustained from this cause.

In addition to the preceding observations, it may be remarked, that those few plants which are totally disregarded by one class of animals, so as to be rejected by them, even in the house, will not, on that account, become less acceptable to others, but greatly the reverse. Thus grass, or other food, that has been *blown* or *breathed upon* by any animal for a considerable time, becomes unpleasant to other beasts of the same species, but not so to stock of another class or variety; for them, indeed, it appears to acquire a higher relish. Even greater defilement by one animal seems to render food more acceptable to others; for straw, which in a clean state has been refused by cattle, acquires such a relish, if employed as a litter for horses, that they seek for it with avidity. Hence it happens, that the sweepings of the stalls from one animal supply a pleasing repast for those of another kind, which can be easily removed from one to the other, if the plants are consumed in the house, but which must otherwise have been lost in the field. And this peculiarity may, as we shall shortly have occasion to show, be employed to answer another useful purpose.

III. With regard to the influence produced by soiling on the *health and comfort of cattle*, the balance is conceived to be clearly in favor of the cutting system, when compared with that of pasturing. Thus, they are not liable to be blown or hoven, or to be staked or otherwise injured by breaking fences: and it is well known that when animals are exposed to the sun, in the open air, they are not only greatly incommoded on many occasions by the heat, but are also annoyed by swarms of flies, gnats, and hornets, which, as well as the terrible *gad-fly*,* drive them into a state of perturbation little short of madness, that obviously tends to impede their thriving. At other times they are hurt by chilling blasts, or drenched by cheerless rains, which retard their feeding. Under proper management, in well constructed stalls, all these evils would be alike removed, and they would be kept in a uniform state of coolness, tranquility, and ease, so as to make the same quantity of food go farther in nourishing them than it otherwise would have done. Lastly, by judiciously mingling green and succulent vegetables with dry

* Sinclair, vol. II p. 19. An experiment is recorded in "the American Farmer," (vol. II.) from which it appears, that seventeen acres of land, under the soiling system, supported as much stock as had previously required fifty; and Sir John Sinclair mentions a singular coincidence in another trial, in which thirty-three head of cattle were soiled, from the 20th of May to the 1st of October, 1815, on seventeen acres and a half, of which fifty were necessary in pasture. Code of Agriculture, p. 487.

* The *Œstrus bovis* of Linnæus, sometimes called the *breeze*.

and nourishing food, as circumstances may require it, and by varying the different articles so as to provoke an appetite, not only the health, but also the thriving of the creatures will be greatly augmented beyond what they could have been by any other mode of treatment.

IV. The proportioned increase of manure obtained by soiling and stall-feeding, further evinces their superiority over pasturing. *Manure* is the life and soul of husbandry; and when tillage is an object of attention, there can be no comparison between the two modes of consumption, especially with regard to the manure obtained by soiling live-stock, during summer, with green food; for, in consequence of the increased discharges of urine during that season, the litter, of whatever substance it may consist, is speedily converted into dung. And there can be no doubt, but that the quantity of manure made during the summer may, by constructing proper reservoirs for the reception of the stale, and by throwing this at leisure times over the litter, be made to equal, if not exceed, the *produce* of the dung accumulated during the winter. The *quality* must depend on the nature of the food.

V. With regard to the *quantity of herbage* afforded from the same field, under the *cutting* or *grazing* systems, the balance will be found equally in favor of the former. All animals, it is well known, delight more to feed on the young and fresh shoots of grass than on such as are older. Hence it invariably happens, that those patches in pastures which happen to have been once eaten bare, in the beginning of the season, are kept very short throughout the remainder of that season, by the animals preferring them to other parts of the field where the grass is longer; so that the latter are often suffered to continue in a great measure untouched. Another circumstance, however, which is not very generally known, is, that grass —even the leafy parts of it—when it has attained a certain length, becomes stationary; and, notwithstanding it will retain its verdure in that state for some months, yet, were it cut, it would have continued in a constant state of progress, proportioned to the frequency of its being cropped.* Experiments have, indeed, been brought forward to prove that with clover, rye-grass, lucerne, and tares, *double the number* of cattle may be supported in much better condition when cut than when pastured; and from the results of other trials, it appears to be equal to five, or even a larger number. Many exaggerated statements have, indeed, been produced in support of the system of soiling; but, without attaching implicit faith to these, we are convinced, from actual observation, that, by judicious management in this respect, the profits of the grazier may be largely augmented.

The practice of soiling and stall-feeding cattle has been adopted, to a considerable extent, on the continent, by Baron von Bulow and others; the result of whose experience is inserted in the first volume of the "Communications to the Board of Agriculture," by Dr. Thaër, physician to the electoral court of Hanover, and which, he observed, has proved the following facts to be incontrovertible.

1. "A spot of ground which, when pastured upon, will yield sufficient food for only *one* head, will abundantly maintain *four* head of cattle in the stable, if the vegetables be mowed in proper time, and given to the cattle in a proper order.

2. "The stall-feeding yields at least double the quantity of manure from the same number of cattle; for the best and most efficacious summer manure is produced in the stable, and carried to the fields at the most proper period of its fermentation; whereas, when spread on the meadow, and exhausted by the air and sun, its power is entirely wasted.

3. "The cows used to stall-feeding will yield a much greater quantity of milk, and increase faster in weight, when fattening, than when they go into the field.

4. "They are less subject to accidents, do not suffer by the heat, by flies and insects, are not affected by the baneful fogs, that are frequent in Germany, and bring on inflammations; on the contrary, if every thing be properly managed, they remain in a constant state of health and vigor."

The facts and inferences above stated fully prove the advantages of soiling. It ought not, however, to be concealed, that there are some inconveniences attendant on the soiling and stall-feeding of cattle; such as, for instance, the additional labor and expense incurred by cutting and carting the green vegetables home to sheds, both in winter and summer. But these are compensated, in a tenfold degree, by the increased value of the food, the thriving of the cattle, the making of the dung under cover, and having reservoirs in which to catch the urine. With this management, one good acre of turnips will produce an excellent dressing for at least an acre of land, and with a very small portion of hay, will completely winter-fat an ox of fifty score. If fed on the land, two acres of tolerable grass may fat an ox, but not so well, nor will he be forwarded so fast in flesh, if exposed to the weather in cold and wet seasons, as if kept dry and moderately warm; and the dressing will be very partial and precarious. Further, where large quantities of food are accumulated together for a considerable time, it is objected, that they are liable to fermentation, and of course to waste; such are cabbages, turnips, and other roots; so, where tares are left on the ground, they are liable to become podded, in consequence of the butt-ends of the vegetables being of a coarse nature, and in a decaying condition, in which state they are uniformly refused by beasts. But these, and many other disadvantages that might be mentioned, may be obviated by paying due regard to the storing of the various vegetable crops, and to their economical consumption. It has likewise been objected, even by persons who in general approve of soiling and stall-feeding, that cattle will, by confinement during the summer months, be too much heated, and that their health will be affected; but stalls may be so constructed as to admit a regular circulation of air, and yet shelter them from the attacks of flies. The cattle may also be allowed the freedom of an open yard. Indeed, in that season, *fold-yards*, with open sheds, are much to be preferred to stalls. This is the practice in Yorkshire, where the management of stock is well understood; and there are not wanting many ex-

* See Dr. Anderson's Essays on Agriculture, &c. Vol. II. Disquisition V. where this interesting fact is corroborated by experimental proofs, which our limits forbid us to introduce.

perienced graziers who prefer air during the utmost inclemency of winter. Air is, indeed, indispensably necessary to the preservation of the health and the speedy fattening of animals; for, if kept too hot, they will perspire profusely, and their hides will itch; this vexes them exceedingly, and necessarily retards their quick feeding, yet some very eminent graziers have pursued this plan with considerable success.*

When grass (whether natural or artificial) is to be given, it ought to be cut in the morning for the evening food, and in the afternoon for the morning; the afternoon crop should be carried to the barn, or some other convenient place, and spread out in order to exhale its superfluous moisture; and, in rainy weather, both crops must be taken off the ground. Attention, however, ought to be paid to the due proportion to be cut; and, until that fact be ascertained, it is a good plan to measure each mess, and to chalk down the quantity *in weight*, which the basket, cart-body, or other vehicle employed for carrying food, contains of the various articles used for that purpose. The practice will, at least, have a tendency to teach farm-servants to observe *method*, the value of which is of considerable importance in all business, and in none of more than in the various branches that are connected with husbandry. In the early part of the season, when tares and clover are either inadequate to the support of the stock, or that it may be thought expedient to change them gradually from dry to green food, a portion of these grasses may be mixed with the hay or straw on which the cattle are fed; and, if the mixture be made up over night, the dry provender will be found to have acquired a sweet vegetable taste, and to be rendered so moist and palatable as to be more readily eaten.

As the various grasses peculiarly calculated for grazing or soiling cattle, will be particularly detailed in a subsequent Book,† we proceed now to state a few of those articles which have been found most useful for the purpose of winter or stall-feeding, or of feeding in the farm yard.

Of stall-feeding neat cattle.

This branch of the grazier's management begins towards the end of October, and lasts for about seven months, that is, till the commencement of May. Of all vegetable productions, *good hay* is undoubtedly the best for fattening cattle, though such hay, except on the most luxuriant soils, will rarely be found capable of fattening animals when finishing off for the market, unless judiciously combined with cabbages, carrots, parsnips, turnips, or similar succulent plants; or oil-cake. Barley, rye, oat or pea-meal, if mixed together, in about equal proportions, with the occasional addition of a small quantity of bean-meal, may likewise be given with advantage, in the ratio of a quartern, or at most half a peck, to each head of cattle, in conjunction with cut hay, if the price will admit. Of the last-mentioned article it may be observed, that the hay made from grass mowed after the cattle, is usually employed for feeding live-stock at the beginning of winter; the best being reserved for the spring; and where a handful of salt has been thrown over each load, when stacked, so grateful is this to them, that they have been known to prefer poor hay *salted* to good hay *unsalted*. Salt acts as a condiment, which appears to assist the digestion; and, from the avidity with which ruminating animals eat it, nature seems to have intended it for their benefit.

One of the most luxuriant of all vegetable productions is the *cabbage* with its numerous varieties, which, when combined with cut pea or oat straw, has been found singularly useful as winter fodder for *store stock;* and which, with the addition of good hay, will fatten oxen or bullocks in the short space of five months, besides yielding a larger quantity of manure than almost any other article used for winter feed.

Parsnips have been employed not only for feeding store cattle, but particularly for fatting oxen, which eat them with great appetite; the benefit thence derived being, in the estimation of some graziers, nearly equal to that obtained from oil-cake: but they are apt to cloy the appetite, and should therefore be given with other food, or if alone, they should not be continued for a long time together. In Jersey, where they are largely used as food for all animals, bullocks are fattened on them in three months. The flesh is considered superior to any other beef, and commands an additional price. To hogs, they are given at first raw, and afterwards boiled, or steamed, and during the last fortnight with bean or oat-meal. The animal is thus sufficiently fatted in about six weeks; the flesh is more esteemed than that produced by other means, and is said not to waste in boiling.*

Next to parsnips we may class the *carrot;* a most useful root, the produce of which is so abundant that, *according to an account of Mr. Young*, *four* bullocks, *six* milch kine, and *twenty* work-horses were fed, a few years since, at Partington, in Yorkshire, for about *five* months, with carrots, the produce of three acres, with no other addition than *a little hay* throughout that period. He adds, that the milk was excellent in point of quality and flavor; and the refuse or waste, with a small quantity of other food, fattened *thirty* swine.†

Mangel-wurzel comes next in order in feeding cattle: indeed, in some late experiments it has been found superior to carrots, and nearly equal to parsnips.‡

Turnips, especially Swedes, also supply a nutritive article of winter food; though, from their peculiarly moist nature, they require to be combined with cut hay, to which a little barley or oat-meal may occasionally be added.

* See the following Chapter.

† Book IX.

* Quayle's General View of the Norman Isles.

† This is one proof, among many, of the vague manner in which experiments are often related, and consequently of the little reliance to be placed on them, when all the details are not accurately stated. Without at all meaning to depreciate the value of carrots, the excellence of which, as food for cattle, is now universally admitted, it cannot escape observation, that they must, in this instance, have been accompanied by *no small quantity* of hay; for only allowing one bushel of carrots per day, to each beast, the quantity would amount to 4500 bushels, exclusive of the swine; that is, 1500 bushels per acre, or about three times the amount of a good crop.—Ed.

‡ For an analysis of the different roots and grasses, see Book IX. Chap. VI.

In the county of Norfolk, however, which has long been celebrated for its turnip husbandry, there are very great numbers of cattle annually fattened for the London market, on little other food than turnips, which are given to them *whole*, and in a raw state; and it rarely happens that any animal is choked, or otherwise injured, by roots sticking in the throat. When this accident occurs, the practice is to pour a horn full of salt and water down the beast's throat; and in case that does not succeed, a similar quantity of *salt and melted grease*, such as hog's lard, or any common grease, or oil, is used, which preparation has rarely been found to fail of procuring relief to the animal in danger of suffocation.

The Norfolk method of *turnip-fattening cattle* is threefold:*—according to the *first plan*, the roots are thrown on stubbles, grass lands, and fallows, to cattle abroad in the fields. This is the prevailing practice, a great part of the cattle fed in that district being fatted abroad: it requires the least attendance, and is allowed to be beneficial to light lands.

The general practice in the county of Norfolk is, to begin with the wheat stubbles, on which turnips are usually thrown, till they are broken up for fallow or barley. The next *throwing-ground* is frequently the barley stubbles, which receive the bullocks, (i. e. fatting and fatted cattle,) as the wheat stubbles are scaled in, and retain them until they are, in their turn, broken up for a turnip fallow. From Christmas till early in April, the clover leys only are thrown upon: and after these are shut up, in order to acquire a bite of grass for the unfinished bullocks, the turnip fallows sometimes become the scene of throwing.

Occasionally, however, the farmers deviate from this mode; some objecting to the throwing of turnips on land intended for those roots the following year, under the apprehension that it produces the disease termed *anbury*.† In this case the clover leys succeed the wheat stubbles, some part of them being kept open till the turnip crop is finished in the spring. Sometimes young clover fields are thrown open; but this is regarded as bad management, unless the season is remarkably dry, and the surface of the earth is perfectly sound; nor is it often done unless there happens to be no clover stubble in the vicinity of the turnip piece.

But though the soil of Norfolk is, in general, very dry, the farmers of that district are sometimes inconvenienced, in wet seasons, for clean ground on which to throw their turnips; and notwithstanding the value of *teathe*,‡ when the land will bear the bullocks, instances have occurred where farmers have requested their neighbors to allow them to throw turnips upon a contiguous piece of old ley-ground, or *olland*, as it is there called; preferring the loss of the teathe to checking his bullocks. On this account, therefore, Mr. Marshall recommends, in laying out a farm upon the Norfolk plan, so to intermix the crops, that there shall be at least two pieces of ley in the neighborhood of each piece of turnips.

The turnips are thrown on the land in the following manner: a cart enters on one side of a close, in which stands a boy, who, as the vehicle is going regularly to the other, throws the roots out, with their tops and tails on, as they are drawn out of the ground; giving every part an equal share, and never throwing twice in the same place, until the whole has been gone over. In the commencement of the throwing season, while there is yet an abundance of grass for lean stock, the usual practice is, to keep the fatting beasts constantly in the same piece of wheat stubble, a fresh supply of roots being given to them every day, or every second day at farthest.

When the clover stubbles are cleared from grass, and the store cattle begin to require assistance from the turnips, the fatting cattle have *followers*, i. e. rearing cattle: lean bullocks, cows, or store sheep follow them to pick up their refuse. In this case it becomes convenient to have three *shifts*, or three pieces of throwing-ground in use at the same time: one allotted for the head beasts, another for the followers, and a third plot empty, for the purpose of throwing turnips on it. Two pieces, or at least two divisions of the same piece, are indispensably necessary; and sometimes a row of hurdles is run across a throwing piece, in order to separate the bullocks from the followers.

In throwing turnips, it is of great importance that they be thrown *evenly* and *thinly*, so that while a beast is breaking up one root, he cannot have it in his power to trample or dung upon another. But sufficient precaution is seldom taken to guard effectually against this inconvenience—though if turnips are cast at the distance of one yard asunder, they are not ill thrown—as they are too often dropped in rows, or clusters, of half dozens together.

Bullocks, which are fed on turnips abroad, are sometimes driven into the straw yard at night, where the distance is not too great; and, occasionally, a little straw is given them under the hedge of the throwing piece, when they continue entirely abroad. The quantity of straw thus consumed is very trifling, the object of it being merely to cleanse their mouths from the dirt of the turnips, on which root alone the farmers place all their dependence for bringing their cattle forward; though there can be no doubt that the straw is also materially useful in correcting the too abundant moisture of the yellow turnip.

Mr. M. remarks, it as an interesting fact, that not one in ten of the highly finished bullocks, which are annually sent to Smithfield out of Norfolk, taste a handful of hay, or have scarcely any other food whatever than turnips and barley straw, excepting such as are fattened off in the spring with ray-grass; and a few that are fatted by superior graziers, who make it a point to give a little hay to their bullocks at turnips, towards the spring, when those roots are going off, and before the grass-leys are ready for their reception; an excellent practice, which ought, if possible, to be generally adopted, as without such precaution bullocks

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* Marshall's Rural Economy of Norfolk, vol. i. p. 287.

† The nature and probable cause of this affection in turnips will be stated in Book IX. Chap. V. Sect. I. where the culture of those roots is discussed.

‡ "This is an important word in Norfolk husbandry, for which our language has no appropriate synonym: it denotes the fertilizing effect of cattle upon the land on which they are foddered with any kind of food; whether such fertilizing effects be produced by their dung, their urine, their treading, or by their breath, perspiration, and the warmth of their bodies."—Marshall's Norfolk, vol. i. p. 34.

are liable to be checked in their progress between turnips and grass. The cattle usually fatted in Norfolk are Scots; instances however have occurred, though rarely, in the county of Essex, in which Northumberland beasts, of the largest size, have been fattened on *turnips alone*, without the aid of any other food.

The *second method* of giving these roots to cattle is by means of close bins, or small cribs, with boards or bars nearly close at the bottom, while the beasts are kept in a loose straw yard. These bins are dispersed over the yard, and the turnips are put into them *whole;* the tap-root, and also the tops, unless they are fresh and palatable, being previously cut off, so that the fatting animals receive only the bulb; the tops, if eatable, being consumed by store cattle.

While the bullocks are in the yard, they have the straw sometimes given them in cribs, and at others it is scattered in small heaps about the yard, twice or thrice in the day; the quantity thus eaten is very trifling, and with the last-mentioned management, the yard becomes evenly littered without further trouble.

The mode of fattening here detailed is attended with somewhat more labor than the preceding method of throwing turnips abroad, which, in Mr. Marshall's opinion, is the preferable management, if the soil be sufficiently dry to support stock, and light enough to stand in need of being rendered firm by treading. On the contrary, where the land is deep, and the season is wet or severe, the straw-yard is the more comfortable place, provided it be kept dry and well littered, and be furnished with open sheds, in which the stock can shelter themselves; for, though the teathe of fatting cattle abroad is greatly beneficial to light soils, yet if bullocks, while fed in the yard with turnips, are well littered, they will make a large quantity of excellent manure, that will amply compensate for its loss.

The *third method* consists in keeping the cattle tied up in hovels, or beneath open sheds, with mangers or troughs for receiving the turnips, which, in this case, are frequently *sliced*, or more generally (though perhaps less eligibly) cut into quarters by means of a small chopper, upon a narrow board or stool, beneath which is a basket for catching the pieces. In this operation the turnip is held by the top, which, when wholly disengaged from the root (except the coarse part immediately about the crown) is thrown aside for the store cattle. The tap root and bottom rind are separated with the first stroke, and suffered to fall on one side of the basket, so that the fattening animals have only the prime part of the plant, with which they get a little hay, or barley straw. In this manner they generally make the quickest progress in fatting, especially in cold weather; but, from its increased trouble, it is confined chiefly to little farmers, who have opportunity to tend their own sheds.

From the preceding facts and statements, Mr. Marshall conceives an eligible plan of management may be adopted, where circumstances will admit of it. In autumn, therefore, while the weather continues moderate, the bullocks may be allowed to remain abroad: but whenever it sets in very wet, or becomes intensely severe, they should be taken and kept under shelter, either until their fattening be completed, or the warmth of spring again invites them abroad. The whole plan is at variance with that of regular stall-feeding, which is founded on the principles of accumulating dung in the heap, and of keeping the cattle in an equal state of warmth; which latter point is generally considered essential to their improvement in flesh. It will, however, be observed, that the Norfolk system combines the improvement of the land with that of the beast; an object which is much promoted by the treading of the animals on the light soils of which that county is chiefly composed. It must also be admitted that many experienced graziers are adverse to stall-feeding, as being prejudicial to health.

Many instances could, however, be adduced in which stall-feeding has been successfully carried to the opposite extreme of heat and confinement. Among others, two are mentioned by the late Arthur Young: the one, in the practice of a very fortunate grazier, Mr. Moody, of Retford, who found warmth of such consequence, that he gradually closed the air-holes of the building, provided with sliders on purpose, till his beasts sweated off the hair, and they did not thrive to his mind until this happened: the other, in a similar system pursued on the farm of Mr. Hanbury, of Coggeshall, who considers it essential to keep the beasts as warm as possible; and that even if it brings off the hair, they thrive the better, and will feel the better at Smithfield.

Mr. Young, whose opinions on agricultural subjects, though sometimes too speculative, are, from his great experience, entitled to the highest respect, was decidedly in favor of warmth; and both on that subject, and on the general slowness of farmers to adopt improvements, he thus strongly expressed himself:—"men farm without an idea of any necessity of knowing what others have done before them; nay, they encourage themselves in ignorance, by a pride of rejecting book husbandry; and it is very right that thousands of pounds should have been lost by oil-cake feeding shivering beasts in open sheds, by men who think they can learn nothing beyond the practice of the old women their grandmothers; while the Board of Agriculture is annually bringing to light, in county reports, practices unknown to the very men who cannot see any use in such publications: but ignorance is its own punishment."*

To return from this digressive account of the Norfolk turnip-management, the importance of which, we trust, will be a sufficient apology for its length:—Lastly, among the various vegetable productions that have been appropriated to the stall-feeding of cattle, none have occasioned greater discussion than *potatoes*. They furnish an excellent supply, particularly when cut and steamed;† and from the subsequent facts, they appear adequate to the fattening of neat cattle, in combination with a comparatively small portion of other food. In the eleventh volume of the "Annals of Agriculture," we meet with the following statements relative to these roots, by Mr. Campbell, of Charlton, in Kent, an able and successful grazier, in answer to some queries that had been proposed to him by Mr. Young. He observes, that 100 bushels of potatoes, and 700 weight of hay are generally sufficient

* Survey of Essex, 1813. Vol. II. p. 304.

† For a simple steaming apparatus, see Book VII. Chap. XI.

to fatten any ox that thrives tolerably well. The roots should, at first, be given in small quantities, which should then be gradually increased to one or two bushels per day; dry food being always intermixed, and the proportion of hay being uniformly regulated by the effect which the potatoes produce on the bowels. There ought to be at least *five servings* in the day; and according to the quantity of roots which a beast can be induced to eat with appetite, he will fatten the sooner, of course with less expense and more profit. The hay should be cut once, or if it be not very weighty, twice along, and three times across the truss, so as to be in square pieces of eight or ten inches, in which state the cattle will eat and digest it more readily, while their fattening is considerably expedited. The potatoes, however, according to Mr. C., need not be cut, except at first, in order to entice the beasts to eat them; but they ought always to be *fresh* and *clean*. No corn or meal is necessary; but if it can be procured at a moderate price, it would contribute materially to facilitate, and of course to render more profitable, the whole system of cattle-feeding. Should a *scouring* be brought on by the use of raw potatoes, which often happens, the quantity of meal or other dry food given them should be increased, until the beasts become accustomed to the roots, when this inconvenience will cease.

Potatoes, however, being an article of constant consumption in our markets, are more subject to variations of price than any of the other roots commonly used for fattening cattle. The grazier must, therefore, be governed by the consideration of their comparative cost, as well as quality. The cultivation of potatoes is also expensive; and there is a general impression (whether well founded or not, it is not our present purpose to inquire) that they exhaust the land; in consequence of which, they are seldom resorted to as a fallow crop, even on soils best adapted to them, while in some of the best grazing districts the ground is too strong and heavy for their growth. It should also be remarked, that when given raw, during a long time, they have been frequently found prejudicial to the health of cattle: the cause has not been ascertained, but it may, possibly, be owing to the poisonous quality known to exist in the juice of the root. When given *steamed*, it has been found an improvement to combine them with Swedish turnips: the turnips being *boiled*, and the juice given with the *dry* potato.

In some districts where winter food is with difficulty procurable, it appears that *heath* may be advantageously resorted to. In a paper on this subject, communicated to the Board of Agriculture by James Hall, Esq., he states, that in the course of numerous experiments on furze, broom, rushes, bean-straw, and other neglected articles, he had discovered, that, if heath be cut when young and in bloom, and the finer parts be infused in hot water, it produces a liquid very grateful to the taste, well flavored, and extremely wholesome. Being anxious to know how far young heath might be useful to cattle, he tried the experiment on a cow. When first tied up, she refused to eat any of the heath, except the very finest part, nor did she appear to relish an infusion of it when set before her: hunger, however, compelled her first to drink the infusion, and then to eat the heath; and on this food only she lived for nearly a fortnight, during which her milk was reduced in quantity, though its quality was much improved. A similar experiment was made on a couple of sheep and an old horse, with nearly the same effect. As food for sheep, indeed, it forms the chief portion of their sustenance on mountain pastures during the latter part of autumn, and the beginning of winter. Satisfied from these experiments, that cattle may be supported for a long time by young heath, Mr. Hall proceeded to ascertain how far the plant was capable of retaining its valuable qualities when dried and laid up. He therefore cut some at the end of the summer, and dried it in the shade; and, at the end of two years it produced an infusion equally strong and well flavored as at first; and the effect was the same at the end of three years. Young heath may be procured by burning the old which remains on the ground; the ashes afford an excellent manure, and generally cause a fine young crop to spring up, which will afford a bite for the flocks in the ensuing months of August and September. This, it is also said, may be cut for hay at two or three years old, and given to cattle when fodder is scarce; and that when intended for this purpose, it should be carefully stacked and kept close, otherwise it will become less valuable:* but, in a late very intelligent account of the husbandry of the county of Sutherland, by Mr. Patrick Sellar, published by the society for the diffusion of useful knowledge, in their "Farmer's Series," no mention is made of this latter application of heather, though he describes its uses for sheep, when eaten on the ground, and states the great difficulty of providing them with food during part of the spring; and, as it is not probable that so obvious a mode of supplying that deficiency would have escaped observation, we may conclude that it has been tried, and not found to answer the purpose.

Fir-tops, or the young and tender shoots of fir-trees, have likewise been employed with effect in a case of emergency, as a substitute for other articles of winter fodder. Of this circumstance we have a striking illustration in the fifth volume of the "letters and papers of the Bath and West of England Society," where a correspondent states, that, being in great want of provender, and having scarcely any hay, he was compelled to feed his beasts on fir-tops, and though he had more than four hundred head of neat cattle, yet he did not lose above four or five out of that number; while many graziers, farmers, and breeders, who resided in the same county, lost one-half, and several of them nearly the whole of their live-stock.† We state this fact, as it was communicated to the respectable society above mentioned; and would recommend attentive experiments to be farther made with this vegetable production, as, in the event of a scarcity of winter provender, it promises to be a salubrious substitute for more invigorating food, which might in a short time be collected, and prove eminently useful in cases of emergency.

[To be continued.]

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* Communications to the Board of Agriculture, Vol. VI. Part 2.

† They have also been used by Mr. Coke, at Holkham, with considerable advantage.

THE FENCE LAW.

To the Editor of the Farmers' Register.

I am glad to see that attention is directed to the law of enclosures, as it at present exists. On this subject a good beginning may be made in the legislature of Virginia, to encourage agricultural improvement. The law as it is at present, is certainly not a wise one. It is oppressive in its nature, and detrimental to the interests of agriculture. Could not some one go back to the date of that law, and by detailing circumstances, throw some light on this subject?

As the law at present stands, the careless farmer is made the assailant, while the judicious farmer, wishing to practice economy, is made the assailed. Let an example be adduced. Let us suppose two farmers, whose lands join. The one comes in possession of his farm, as an inheritance from injudicious ancestors, who previously to his taking possession, and very likely before he was born, had cut most of his rail timber, leaving him not enough to enclose all his open land, and scarcely sufficient to erect a "*lawful fence*" around his cultivated fields. His more fortunate neighbor has an abundance of timber to enclose the whole of his farm with more than a lawful fence. The latter can turn his stock out, and what is the consequence? It must be at once obvious. The scanty farm, or a great part of it, becomes a pasture for his neighbor's stock. The first farmer's unenclosed land will be picked clean, while at the same time he lives in constant dread, that his fence will not prove for his crop a barrier to their encroachments. Thus, the unenclosed land is empoverished by his neighbor's cattle. But suppose the last be required to keep his stock on his own land: the out-land would rest, and become rich. This is but an example of thousands of instances all over this State; thus presenting Virginia, as one large common, like the fabled giant in the ancient hell, whose liver is ever devoured by dogs, but never completely destroyed. What would be the result if every farmer was required to keep his stock on his own land? Their out-lands would improve, because they would be as enclosed lands. The number of stock would be lessened, while the quality would be improved. Soiling would be commenced; and the good effects of not having out-lands grazed, would soon prove to the farmer that his cultivated lands should not be grazed, and that he would gain more by letting his grass enrich his lands, than by permitting his stock to eat it, or tread it down.

Could these happy results be realized, what a change would be effected in Old Virginia. I should like, sir, to see an estimate made of the number of acres of unenclosed land now in Virginia, which is left the prey to strolling cattle. I have not the data by which any estimate could be made. If some tolerably correct account could be given, it might serve to awaken more attention to this subject. How frequently, in passing over the county, do we see farms from some cause or other, deserted, with fences down, the prey of every man's cattle! Farms in the neighborhoods of villages frequently suffer much in this way. As the law at present exists, one man is required to keep his neighbor's stock off of his cultivated lands, while they may legally run on his out-land. As it should be, every man should be required to keep his stock on his own land, and off of his neighbor's. In a provision of this sort, the dimensions of the fence might not be mentioned. This the owner could best judge of. One obvious result would grow out of this provision; the same fence would more frequently be made to serve two neighbors, and in this way, bones of contention would be removed. Instead of each leaving unenclosed lands between them, one fence, would be on the line. But I leave abler pens to point out the many good results of such a provision. One more thought, and I am done. Laws to be obeyed, must tend to promote the interests of all, or a *decided majority*. The law as it now is, is detrimental to a majority—and its breach tends to the direct interest of not a few. Take the example first cited. If A, who has the good fence, is not the man he should be, he cares not how much B's crop is injured. He might be even tempted to throw down a tottering rail, or to leave a gap. The law, as it should be, would be to the decided interest of a majority. B would soon have the law on A, if he did not keep up his stock. And the fact that neglect on his part would tend directly to his injury, would make him careful. The old English law on this subject was very strict: forfeiture with heavy damages.

If the legislature will not adopt the recommended provision, surely the palpable evils of the present law will demand a repeal. But, sir, may we not look for better things from the legislature of Virginia? Will not men consult their *own interest?* A bright day is dawning on Old Virginia, if her patriotic sons who represent her interests, will make the move. Certainly many members of the present legislature, read your valuable journal. Some, I know, contribute to its columns. Will they direct their first attention to this point? It is a good subject for a beginning. They may take a burden or a grievance off, if they will not confer a direct benefit. Your public spirited correspondent well remarks, that next to "general education," this subject demands the most attention. This was well said: and agricultural improvements require aids to be effected just as the mind requires systems of education." God speed the day when the genius of education shall shed her mild but brilliant light over every part of our beloved State, leaving no "corner" where ignorance with her "hideous crew," may dwell, the ready handmaids of rampant ambition, or arch deception—and when agriculture will present a "smiling land."

T. B. MCR.

Retirement, Prince Edward.

INFLUENCE OF THE MOON ON VEGETATION.

To the Editor of the Farmers' Register.

An opinion prevails to a considerable extent, that the moon has an influence on the weather: that is, that changes of weather are more likely to occur about the full, quarters, and change of the moon, than at other times. On this subject many observations have been made, and a number of essays written, *pro* and *con*, but without settling the question.

Another opinion, the influence of the moon on vegetation, though less common, is more firmly believed in and acted on by those who embrace it, than the other. I do not, however, recollect to have seen any thing in print on this subject.

The Dutch generally, and a good many others, believe that the growth and perfection of vegetables depend, to a considerable extent, on the state of the moon at the time of planting or sowing their roots. Such as potatoes, turnips, beets, &c. &c., should be planted or sowed on the decrease, and wheat, peas, &c. on the increase of the moon. They also believe that pork and beef should be slaughtered before the full.

In the year 1833, the following experiment passed under my observation. Three days before the full moon in March, two rows of Irish potatoes were planted, and two weeks after a further planting was made, to some extent; the soil, seed, and preparation being the same. When potatoes were expected for use, the first planted were not larger than peas, while the second were as good as expected—became very fine, and in the course of the summer ceased to grow, and the tops died. The first planting grew to a great length, (one plant measured eight feet ten inches,) and continued green till frost, when they were dug, and produced about a third, possibly half as much as first planted. I have at other times had potatoes of similar character, but did not attend to the state of the moon. Many farmers, no doubt, have observed that their crops of wheat, corn, &c. or part of them, sometimes turned out worse than from the nature of the soil, and other circumstances, they expected. Still I admit that it requires many experiments made with accuracy and judgement, to establish, beyond doubt, the existence of such a principle: and although the Dutch who universally believe and act on it, are notoriously more successful than most others, yet it may be that this success is the result of more careful tillage.

If such an influence does exist, it is important to the interests of agriculture that it be satisfactorily established. As radishes are of quick growth, an experiment might be easily made, and repeated as often as necessary, by sowing a few seed every week for four or eight weeks.

It is to be hoped, Mr. Editor, that you, or some of your intelligent correspondents, will be able to give us some light on the subject, and let us know whether it is any thing more than "a mere matter of moonshine."

AN INQUIRER.

CHEAT AND WHEAT.

To the Editor of the Farmers' Register.

In looking over the Farmer's Register, I have been struck with the readiness with which some of your correspondents gave into the notion, that a certain portion of their wheat was transmuted into cheat, upon what I consider to be very insufficient testimony. Sometime in the month of May or June last, I had occasion to leave home for some days, and when I returned, on inquiring of my overseer how the wheat crop came on, he, in a most desponding tone, informed me that the prospect was very *bad*—"that all the wet places had turned into cheat." I laughed heartily at him for entertaing such a notion—for I had always thought it absurd. I went to examine, and somewhat to my surprise, found that in those parts of the field which had not been properly drained, the wheat had entirely disappeared, and nothing but cheat remained. I did not infer, however, that the wheat had turned into cheat, but that the wheat had been destroyed by too much wet, and that the cheat, being a hardy plant, had survived, and having nothing to interfere with it, had grown very vigorously, so as to cover the ground. I at once instituted a strict examination, and found that the cheat was very much mixed throughout my crop. There were as many plants in the most vigorous parts of the wheat as in the wet spots; but the wheat being more vigorous, either concealed the cheat, or checked its growth, so that it could not be as distinctly seen. I never have believed that wheat changes its essential quality so far, as to become another plant, of a totally different nature. Many experiments have been tried to establish the fact—but none that have come to my knowledge, have been satisfactory. When I first took possession of the farm on which I live, the cheat was growing on various parts of it. It has rapidly increased, so as to become a serious evil: but I can account for its increase on principles much more rational than that of its originating from the wheat. I have known the fact that it existed in my seed wheat from the first, and that it has gradually increased; but I am well satisfied its increase has been owing to my using seed thus mixed with cheat. The cheat grows very luxuriantly in various parts of my land. It is not destroyed by rest, nor by cultivation. It will spring up for years on the same spot, and it would be matter of surprise, if it did not mix in the wheat crop. Give me seed free from cheat, and land where cheat has never grown, and I have no fears that cheat will show itself in the crop; but let the seed once get among your wheat and it will never be eradicated until some more efficient mode of cleaning is resorted to.

A.

THE TIME TO CUT TOBACCO.

To the Editor of the Farmers' Register.

In the last number of the Register I find a communication on the subject of the management of tobacco, signed "Wardsfork," in which the planters are cautioned against letting their tobacco get thoroughly ripe. Whilst I cannot pretend to set myself up as a guide to the distinguished planters of Wardsfork generally, I doubt not, a large majority of them will bear me out in saying, that "Wardsfork" (skilful as I know him to be) is here out of the secret. It has been held by them as essential to a crop of good quality, that it should be suffered to get thoroughly ripe before it is cut. The only evidence Wardsfork gives, is that the heaviest and highest price tobacco he ever made, was cut before it became very ripe. This opinion is new to me, and to many others—and I appeal to the planters of Wardsfork, whether this is not a heresy, and whether Wardsfork ought not to sustain his doctrine with more conclusive testimony, (than the weight and price of his tobacco) before he incurs the responsibility of leading many, who have great confidence in his skill and opinions, to follow his example. I will venture to assert, that of the ten or twelve distinguished planters on Wardsfork, he is the only one that entertains that opinion. And it seems to me, that it is contrary to the very nature of things. There is a point of maturity in every species of vegetation, beyond which it must decline: but that

point is certainly thorough maturity—any thing short of this must be imperfect. The best planters I know, are those who let their tobacco get thoroughly ripe—and the best tobacco I ever saw, was that which was cut the ripest. My own experience has been, that tobacco cut before the whole leaf is ripe, will be found tender and devoid of elasticity; as well as uniformity of texture and color throughout the leaf—while perfectly ripe tobacco is almost certain to present these qualities. If the tobacco is suffered to stand in the field until it has passed the point of perfect maturity, then I concede there is a loss both in the weight and the beauty of the crop. The question turns then upon this point—when is tobacco matured? I hold that when the leaf will break readily on doubling between the finger and thumb, and presents a beautifully varied complexion of green with yellow spots, and a surface smooth and rich throughout, even to the fringe or ruffle around the stalk, where the stem grows to it: that then it is mature—and such will be its appearance in all ordinary seasons. In very wet seasons, the yellow spots do not always appear, owing to the great quantity of sap—which was probably the case with those crops of Wardsfork, which turned out so well—but in this case the brittleness is increased.

I hope Wardsfork will duly appreciate my motives in declaring my dissent to the doctrine he has advanced. With the highest respect for his character in all the relations of life, and especially as an enlightened agriculturist, and with the most unfeigned good will personally towards him, I can have in view no object but to elicit truth, and to promote the cause in which we are both engaged. For however we may differ in relation to the point in dispute, I do not pretend to set my skill up in competition with his, but merely caution those who are accustomed to make good tobacco, not to listen too much to suggestions, not sustained by long experience, or convincing testimony.

M.

From the Southern Banner.

SUBTERRANEAN VILLAGE.

Naucoochee Valley, June 8, 1834.

Gentlemen—A singular discovery has recently been made in this vicinity, of a *subterranean village*, which though not so extensive as Herculaneum or Pompeii, involves much mystery and speculation, and offers a new subject of inquiry to the geologist and antiquary. The houses were disinterred by excavating a canal for the purpose of washing gold. The depth varies from seven to nine feet—some of the houses are embedded in the stratum of gravel, which is auriferous, and yields fine profit to the operators.—The logs are but partially decayed, and from ten to twelve feet long. The walls are from three to six feet in height, joined together, forming a straight line upwards of 300 feet in length, comprising 34 buildings or rooms. The logs are hewn at the ends, and notched down as in ordinary cabins of the present day. In one of the rooms were found three baskets made of cane splits resting upon the slate, also a number of fragments of Indian wear, similar to that manufactured by the Cherokees at the present period.

From the circumstance of the land having been covered with a heavy growth of timber previous to its cultivation by the whites (twelve years since,) we must necessarily infer, that they were built at a remote period, and by some powerful cause have been submerged and covered by continual additions of alluvion. The stream is about 30 feet wide, and is said by Mr. Sanford, (who is now operating on it for gold very successfully, and from whom I derived most of my information with regard to the houses,) to be one of the most productive gold deposites in the country. The houses are situated from fifty to one hundred yards from the principal channel of the creek and as no farther excavations have been made, it is more than probable, that new and more interesting developements will be made when the land is worked for gold.

A great number of curious specimens of workmanship have been found in situations, which preclude the possibility of their having been moved for more than a thousand years. During my mining operations last year, I found at one time, about one half of a crucible, of the capacity of near a gallon. It was ten feet below the surface, and immediately beneath a large oak tree which measured five feet in diameter, and must have been four or five hundred years old. The deposite was diluvial, or what may be termed table land.

The stratum of quartz gravel in which the vessel was imbedded, is about two feet in thickness, resting upon decomposed chlorite slate.

It is not difficult to account for the deposite of those substances in alluvial soil, for the hills are generally very high and precipitous, and from the immense quantity of rain which falls, the streams are swollen to a great height, sweeping every thing with them, and frequently forming a deposite of several feet in thickness in a season; but some of the diluvial land is from ten to fifty feet above the present level of the streams. These deposites exhibit appearance of as great attrition as those recently formed.

There was a vessel, or rather a double mortar, found in Duke's Creek, about five inches in diameter, and the excavation on each side was nearly an inch in depth, basin like, and perfectly polished. It was made of quartz which had been semi-transparent, but had become stained with the iron which abounds in quantity in all this country. In the bottom of each basin was a small depression half an inch in depth and about the same in diameter. What its use could have been, is difficult to conjecture. Some suppose it was used for grinding paint, &c., or in some of their plays or games. The high finish, and its exact dimensions, induce me to believe it is the production of a more civilized people, than the present race of Indians.

Respectfully yours,

M. S.

From the Southern Planter.

BRIMSTONE FOR CATTLE.

Dr. Bartlett: It is probably not known to many of our farmers that brimstone is valuable for cattle in keeping them free from ticks. These vermin are not only filthy in their appearance, but an injury to the cattle. A piece of brimstone as large as a grain of corn, well pulverized, given in a little salt, will cause them to drop off, and prevent others from getting on for eight or ten days. I consider brimstone as necessary for a cow in the summer, as salt.

ON THE PETITION FOR A CHANGE OF THE LAW OF ENCLOSURES.

If the question of the good or bad policy of our present law of enclosures was considered fairly, either as a matter of right and justice—of public interest—or of private interest to nineteen-twentieths of all the individual cultivators of the soil of Eastern Virginia—there would be no doubt of the condemnation of the law, on either, or all of these scores, by any intelligent tribunal, having in consideration the circumstances and well-being of all. But, unfortunately, almost every question affecting public and general interests, is discussed upon false or improper grounds; and it is easy to foresee what will be the grounds assumed to oppose this beneficial change. It will be said by those who, for their own aggrandizement or profit, are ever attempting to delude the poor and ignorant by professing to be their exclusive friends and defenders, that this change is for the benefit of the rich, and cannot be made but by sacrificing the rights and interests of the poor. But the slightest consideration will show that the benefit to be derived by land occupiers (other circumstances being alike) will be the greater in proportion to the small extent of their possessions—as every one knows that the smaller the fields are, the greater extent of fencing is required to enclose them, in proportion to their size. Hundreds, perhaps thousands of small tracts of land in Lower Virginia, are left untilled, waste, and unproductive, because the whole rent or net product, would not pay for the expense of fencing—whether with our perishable "old field pine" timber, or with more durable and more costly materials. Of course, such land yielding nothing to the owners, is worth nothing for them to hold: but may be sold for a low price to some adjoining large landholder, who can afford to bring the land into part of a much larger enclosure. If he had not this advantage, he could not afford to give any thing for the land, for the same reason that the first owner could obtain nothing by its cultivation: but his owning a large body of land enables him to buy of his poor neighbor at $2 per acre, what will be to the purchaser worth perhaps $4 or more, and which to the seller was worth nothing. Such effects of our fence law are numerous and notorious. Indeed, if wealthy men and large landholders wished to buy up the small tracts of their neighbors' at the lowest price—and if they were so short-sighted as to expect to prosper by the general loss and distress of the community—they ought to sustain the present law of enclosures, as the sure means for reaching their object.

But perhaps it is still a poorer class for whose interests the "friends of the poor" will uphold the present law—those who own *no land*, and who by the present law enjoy the privilege of keeping stock on the unenclosed lands of others. Those who will venture to use this argument ought not to be ashamed to demand that no laws should protect our corn and meat houses, lest the poor should suffer for want of food. But should it be required to oppose this miserable petty larceny ground of argument, (it deserves no better name,) it would be better to buy up this existing privilege, at double its full value. The privilege of grazing the unenclosed lands of other persons in Eastern Virginia, is worth scarcely any thing to the few who use it, and costs at least an hundred times as much to those who suffer the grievance. All the stock raised by grazing at large, and the profits of every kind, just and unjust, derived from the existence of the law of enclosures, would not pay one-tenth part of its cost to the community. The change asked for, which is simply that each man shall secure his own stock, would serve to add one-fourth to the average net profits of cultivation throughout Lower Virginia. If the greater comparative extent of forest, and other land unfit for tillage, west of the Blue Ridge, makes a change there inexpedient, there is no reason why the existing law should not remain in operation there, as long as those circumstances may continue. It is unnecessary here to repeat the arguments for the change of this law, which have already been presented in several articles, to our readers. We have aimed to confine our remarks to those points, which, as being of minor importance, have been passed over, or but slightly touched by others.

The foregoing remarks were written for the 5th No. and were at first intended to accompany the petition for a change of the law of enclosures: but were kept back as not required, and because it was useless to anticipate objections which had not then been made. No considerable objections were to be expected, so long as the discussion was confined to men of intelligence, and to all those who *read*, and are thereby entitled to judge for themselves. The objections that *might* proceed from such persons (for none have yet appeared in print,) would be founded on reason and justice, and would be such as they who uttered them would have no cause to be ashamed of. There will always be some strong objections to a thorough change of any long established and widely operating policy—and the advocates for this, cannot claim the existence of the fence law to be a case of unmixed evil. Objections of this kind, whenever they may be presented, should be met with respect, and opposed as proceeding from friends who have in view the same general object, the preservation and promotion of the interests of agriculture. But since our publication of the petition to the legislature on this subject, the cause has been transferred to a very different tribunal—to court yards and places for warrant trials, where fifth rate demagogues, who read nothing that serves to increase their glimmering lights, can influence the opinions of those who do not read any thing. Judging from the verbal reports that have reached our secluded dwelling place, the pitiful ground of argument, which was anticipated above, is mainly relied on by these self-constituted and noisy guardians of the interests of the people. They take precisely the position that we expected before they had ever heard of the question. The ground of objection and the manner of its being urged, are similar to all other attempts to array the poor against the rich, which have at all times proceeded from those men, who were striving to build up their own dirty interests, by deluding and defrauding both poor and rich. There are few men, capable of exerting the smallest political influence, who are so foolish as to believe that even the poor can be benefited by mea-

sures which impair the rights of property. Those who urge such measures with any success, *know* that all classes, and the poor not less than the rich, are interested in preserving the rights of property: but the office seeking demagogue also knows that his own interest may be served by his country's loss, and his own interest is all he seeks. Whatever may be his rank in the despicable roll—whether his ambition aims at the highest or the lowest office in the people's gift, the general course of the demagogue is the same. When he talks about "honor and patriotism, pure disinterestedness, and devotion to the popular will," there is most reason for the people to expect an attack upon their political rights, and property.

Labor is the only source of all property. There is nothing that helps to constitute wealth which has not been created by, or received the whole of its value from labor alone. God has given to man in abundance the materials for wealth—but these materials require to be worked up, and brought into a useful and productive state by labor, and without it they are utterly worthless. The property of the richest farmer in Virginia, to the last cent, was acquired by his labor of body or mind—or by the labor of his forefathers, or of whomsoever he received his property by the course prescribed by law. Every man, from nature, derives the pow to labor, and by its exercise, the ability to accumulate property—and in this happy country, there are few citizens having nothing but their labor, who might not pass from this class, to that which holds property accumulated by the previous exercise of labor. The preservation of the rights of property is as indispensable to aid the first conversion of labor to wealth, as to secure the possession afterwards—and every man is personally and deeply interested in preserving the sanctity which has generally been attached in Virginia to the rights of property. Without these rights, all would be as poor as the most destitute now are—and every violation permitted to exist, serves not only to lessen the security and value of accumulated property, but also to obstruct its accumulation.

From the Library of Useful Knowledge—Farmer's Series.

PHYSICKING HORSES.

This would seem to be the most convenient place to speak of physicking horses, a mode of treatment necessary under various diseases, but which has injured the constitution of more horses, and in fact absolutely destroyed more of them, than any other thing that can be mentioned. When a horse comes from grass to hard meat, or from the cool open air to a heated stable, a dose of physic or even two doses may be useful to prevent the tendency to inflammation which must be the necessary consequence of so sudden and great a change. To a horse that is becoming too fat, or has surfeit, or grease, or mange, or that is out of condition from inactivity of the digestive organs, a dose of physic is often most serviceable; but we do enter our protest against the periodical physicking of all horses in the spring and the autumn, and more particularly against that severe system which is thought to be necessary to train them for work, and the absurd method of treating the horse when under the operation of physic.

A horse should be carefully prepared for the action of physic. Two or three bran-mashes given on that or the preceding day are far from sufficient, when a horse is about to be physicked, whether to promote his condition or in obedience to custom. Mashes should be given until the dung becomes softened; a less quantity of physic will then suffice, and it will more quickly pass through the intestines, and be more equally diffused over them. Five drachms of aloes, given when the dung has thus been softened, will act much more effectually, and much more safely than seven drachms, when the lower intestines are obstructed by hardened fæces.

On the day on which the physic is given, the horse should have walking exercise, or may be gently trotted for a quarter of an hour twice in the day; but after the physic begins to work, he should not be moved from his stall. Exercise then would produce gripes, irritation, and possibly dangerous inflammation. The common and absurd practice is to give the horse most exercise after the physic has begun to operate.

A little hay may be put into the rack; as much mash may be given as the horse will eat, and as much water, with the coldness of it taken off, as he will drink. If, however, he obstinately refuses to drink warm water, it is better that he should have it cold, than to continue without taking any fluid; but he should not be suffered to take more than a quart at a time, with an interval of at least an hour between each portion.

When the purging has ceased, or *the physic is set*, a mash should be given once or twice every day until the next dose is taken, between which and the *setting* of the first there should be an interval of a week. The horse should recover from the languor and debility occasioned by the first dose, before he is harassed by a second.

Eight or ten tolerably copious motions will be perfectly sufficient to answer every good purpose, although the groom or the carter may not be satisfied unless double the quantity are procured. The consequence of too strong purgation will be, that a lowness and weakness will hang about the horse for many days or weeks, and inflammation will often ensue from the over-irritation of the intestinal canal.

Long continued custom has made aloes the almost invariable purgative of the horse, and very properly so; for there is no other at once so sure and safe. The Barbadoes aloes, although sometimes very dear, should alone be used. The dose, with a horse properly prepared, will vary from five to seven drachms. The preposterous doses of nine, ten, or even twelve drachms are, happily for the horse, generally abandoned. Custom has assigned the form of a ball to physic, but good sense will in due time introduce the solution of aloes, as acting more speedily, effectually, and safely.

The only other purgative on which dependence can be placed is the croton. The farina or meal of the nut is used; but from its acrimony it should be given in the form of ball, with linseed meal. The dose varies from a scruple to half a drachm. It acts more speedily than the aloes, without the nausea which they produce; but it causes more watery stools, and consequently more debility.

Linseed oil is an uncertain but safe purgative,

in doses from a pound to a pound and a half. Olive oil is more uncertain but safe; and castor oil, that mild aperient in the human being, is both uncertain and unsafe. Epsom salts are inefficacious, except in immense doses of a pound and a half, and then not always safe.

From the Fincastle Patriot.

WHITEWASHING.

It is a very common practice to whitewash rooms, walls, and fences, with simple lime and water. The result is, that a touch brings it off upon the hands or clothes, and a few successive rains leave almost entirely bare the materials upon which it has been laid, and which are exposed to the weather. On in-door work a little glue will fix it so that it will not easily rub off, nor whiten the dress that happens to come in contact with it. Out of doors, glue alone will not answer. Skimmed milk is probably the cheapest and best ingredient that can be easily procured. Those who put whithwash without any thing of this kind to retain it, act on the same principle as if they should fill a seive with water, or cover a house with shingles without nailing them on.

WINES AND VINEYARDS.

[For the following extracts from the *Journal of a recent visit to the principal Vineyards of Spain and France*, we are indebted to the review of that work by the London Monthly Magazine. The general reader may be amused by some of the details, and the consumers of what are called *old and pure wines* will be more interested than pleased, to learn some of the secrets of trade, concerning the age and purity so highly prized.

There are certain kinds of wine, of which the *Hermitage* is one, of great celebrity, each of which is the product of only one (and that a very limited) body of land. The high prices of these wines have been a sufficient inducement to produce elsewhere others of like qualities: and their character has been established long enough to give full time for attempts at imitation. It is certain that the peculiar qualities of these wines cannot be caused by climate, because the like cannot be made at the distance of a mile—nor by the *apparent* texture of the soil, nor inclination of its surface, as both these could be found in many other situations. The passage below concerning the calcareous soil (and that not too highly calcareous) of the Hermitage vineyard, seems to indicate the cause of the value of the product to be in the quality of the soil; and that the peculiar quality of soil required, though not evident to the senses, may be easily discovered by chemical analysis. It is not expected that calcareous manures will give the flavor of Hermitage wine to that of all vines: but it would be worth trying whether such manures would not improve the flavor and increase the product of all vineyards in this country. There is so little of natural calcareous soil in the old settled parts of the United States, that it is most probable that not one vine has been planted on such soil. It would be very easy to try the application on a few vines; and if it was found beneficial, vineyards, from their small extent and great value, might be limed or marled at an inconsiderable expense, no matter where situated. If there should be found no other benefit, an important one might be found in this—that calcareous soil suffers much less than any other by the extremes of both wet and dry weather—and the first of these extremes, is particularly hurtful to the products of vineyards.]

"A violent storm of wind and rain made it impossible to quit the house yesterday, and though the rain continued to fall at intervals to day, I managed to visit, in company with Dr. Wilson, the cellars of the house of James Gordon and Company. The extent of these cellars is quite immense—the extreme length of the largest being 110 Spanish *varas*, about 306 English feet, and the breadth 222 feet; the roof is supported by rows of massive square columns of mason work, and although the whole cellar is not of the above length or breadth, the principal division of the building being only 200 by 150 feet, yet with its various adjuncts, the whole extent of the cellar is equal to the dimensions first stated. Messrs. Gordon and Company have also another very extensive cellar, though not equal to this in dimensions. Their ordinary stock of wine is said to be 4000 butts: this is kept in casks of various sizes, containing from one to four butts. These casks are ranged in regular rows; in some parts of the cellar to the height of four tiers. They are called *seleras*, and are always retained in the cellars. They contain wines of various qualities and ages—from one to fifty years. The wine merchants of *Xeres* never exhaust their stock of finest and oldest wine. According to the place at which the wine expedited to the market is intended to be sold, it contains a larger or smaller proportion of old wine. But is only in wines of very high price, that even a small portion of their finest wines is mixed. What is withdrawn from the oldest and finest casks, is made up from the casks which approach then nearest in age and quality, and these are again replenished from the next in age and quality to them. Thus a cask of wine, said to be fifty years old may contain a portion of the vintages of thirty or forty seasons." * * * * *

"The highest qualities of sherry are made up of wine the bulk of which is from three to five years old, and this is also mixed in various proportions with older wines. Thus, from the gradual mixture of wines of various ages, no wine can be farther from what may be called a *natural wine* than sherry. But, besides giving the wines, as they are prepared for the market, mellowness and richness, by the additions of older wines, there is a very dry kind of sherry called *Amontillado* or *Montillado*, which abounds in the peculiar nutty flavor that distinguishes sherries, and which is frequently added when that is deficient. Being very light in color, it is also used to reduce the color of sherries which are too high; and when, on the other hand, color is required, the deficiency is made good by the mixture of *boiled wines*, or rather of *boiled must*."

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"The lowest priced sherries are in general the growth of Port St. Mary's or San Lucar, two districts within ten miles of Xeres; or they are brought round from Malaga to Port St. Mary's, and thence

transhipped for England under the name of sherry, perhaps after having been landed and mixed with other wines to give them the qualities in which they are deficient. All these low-priced wines are largely mixed with brandy, being intended for the consumption of a class of people who are unable to judge of any quality in wine but its strength. But brandy is added in very small proportions to the good wines—never in greater quantities than four or five per cent. while they remain in the cellar, and frequently not at all, unless the wine should become *scuddy* or *mothery;* and thus the finest wines are frequently entirely free from it; but on their shipment, a small dose of brandy is considered absolutely necessary even to fine wines,to make them bear the voyage, as it is said; but in reality, because strength is one of the first qualities looked for by the consumers."

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"On entering his cellar, or rather pressing-room, we found the laborers at their dinner. Bread seemed here, as elsewhere, the chief article of their diet. There was also abundance of prickly pears and grapes. We passed to the cellar where the new-made wine was stored, and tasted in its various states. The wine of a fortnight old was still very sweet, although the fermentation was now barely sensible. We also tasted the sweet wine of the same age, made from the *Pedro Ximenes* grape, and we conceived it to be barely possible for any thing to be more luscious, although we were informed that in a dry season it is much richer. He said he had about 200 butts of the sweet wine, and wished it were all of that quality, it was so useful in mixing with his purchased wine for exportation."

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"On returning from the cellar to the pressing-room we found the presses at work. There were eight troughs, similar in shape and dimensions to those formerly described, each with its wooden screw in the centre. A large quantity of grapes being heaped up in one part of the trough, they commence by strewing upon them as much powdered gypsum, or sulphate of lime, as a man can take up with both hands. A portion of the grapes are then spread over the bottom of the remainder of the trough, upon which the men jump with great violence, having wooden shoes, with nails to prevent their slipping. After the greater part of the grapes are pretty well broken, they are piled up round the screw, and a flat band, made of a kind of grass, is wound round the pile, commencing at the bottom, the broken grapes being heaped and pressed in as the band is wrapped higher and higher, till they are all compressed into it. They then commence working the screw, and the *must* flows with great rapidity."

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"Some of them, he says, are twenty years old and upwards. Some of his wines of seven or eight years old resembled a good sherry, and he agreed with me in thinking that his sweet wine of that age was equal to those three times as old. He further agreed with me, that the great age of those wines did by no means add proportionably to their quality; and he evidently understands the art of giving the qualities generally attributed to age, by mixing, and other management. He himself hinted at the success with which he had conducted this branch of trade, and he has the reputation of having acquired great wealth."

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[At Perpignan] after taking chocolate we proceded to vineyards. Mr. Durand only cultivates three varieties of vines, the Grenache, which gives sweetness, the Carignan, which gives color, and the Mataro, which gives quantity. His vines are in general planted either on the plain or on a gently inclined slope; but when there is a slope the exposure is always to the south. The soil is loose and stony,the stones *quartz*, of various colors and shades." [This wine is known by the name of Rousillon.]

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The finest Clarets of Bordeaux are mixed with a portion of the finest red wine of Hermitage, and four-fifths of the quantity of the latter which is produced are thus employed. The wines are racked off the lees in spring, and sulphured. A very small piece of sulphured match is burnt in the casks intended for the white wine; the red wine requires a greater portion. These matches are purchased from persons who make a business in preparing them. They are slips of paper, about one inch and a half broad, and when coated on both sides with sulphur, are about the thickness of a sixpence. A piece of one inch and a half square is sufficient for a cask of white wine containing 50 gallons."

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"The hill of Hermitage is so called from an ancient hermitage, the ruins of which are still in existence near its top. It was inhabited by hermits till within the last 100 years. The hill, though of considerable height, is not of great extent; the whole front which looks to the south may contain 300 acres, but of this, though the whole is under vines, the lower part is too rich to yield those of the best quality, and a part near the top is too cold to bring its product to maturity. Even of the middle region the whole extent does not produce the finest wines. M. Machon, the gentleman whose property we were traversing, pointed out to me the direction in which a belt of calcareous soil crossed the ordinary granitic soil of the mountain, and he said it requires the grapes of these different soils to be mixed, in order to produce the finest quality of Hermitage. I took home a portion of the soil which he pointed out as calcareous, and the degree of effervescence which took place on my pouring vinegar upon it, indicated the presence of a considerable portion of lime. It is probably to this peculiarity that the wine of Hermitage owes its superiority, for to all appearance many of the neighboring hills on both sides of the Rhone present situations equally favorable, although the wine produced even upon the best of them never rises to above half the value of the former, and in general not to the fourth of their value. A good deal may also be attributable to the selection of plants. The best red wines of Hermitage are made exclusively from one variety, and the white wines from two varieties; but in the district generally a much greater number of varieties are cultivated. The Red Grape is named the Ciras. The white varieties are the *Roussete Marsan.* The former yields by itself a dry and spirituous wine, which easily affects the head—the plant produces indifferently—the latter yields a

sweeter wine—they are mixed together, to produce the best white Hermitage."

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"After quitting the vineyards of Champertin, I rejoined the cabriolet, and after recovering the main road, proceeded to Clos Vougeot. This vineyard formerly belonged to a convent, and the buildings are therefore rather extensive. What was the old vineyard is enclosed by a high stone wall, but M. Ouvrard, the present proprietor, has also acquired a considerable portion of the land without the wall, and the present extent of the Clos Vougeot is therefore 48 hectares, 112½ English acres.

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"They commence selling [the Clos Vougeot] it when three and four years old; but the wine of very favorable seasons is retained by the proprietor till it is ten or a dozen years old, when it is bottled, and sold at the rate of six francs a bottle. The price of the wine of ordinary vintages, from three to four old, is from 500 to 600 francs the hogshead, but seasons occasionally occur when the wine is not better than the *Vin Ordinaire* of the country. The wine of 1824 was given to the laborers as their ordinary drink, that of 1825 is now ripening in the large vats, and will be worth, in three or four years more, six francs a bottle. The wine has been found by experience to be of better quality, and to preserve its perfume better, in these large vats than in casks."

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"The very eminent wine house of Messrs. Ruinart and Son, of Rheims, are agents for Herries, Farquhar, and Co.'s notes. Having called upon them to cash one of these, M. Ruinart, junior, conducted me over their wine cellars, which are very extensive and all subterranean, consisting of three under-ground stores, one beneath another, all mined out of the limestone rock. The wine [Champagne] which has received the last attentions which it requires, and is ready for expediting to the consumer, is packed in large square masses, bottle above bottle, and side by side, with no other precaution to keep them steady than a lath passing along between the necks of one layer and the butts of the next layer above. They generally send the wine to the consumer at the age of three and four years, but after the first winter it is all put in bottle. The stock therefore, appears immense, and indeed it is very large, for not only are different qualities required, but also different descriptions to suit the varying tastes of their customers in England, America, and Russia, to which countries Messrs. Ruinart make their chief exports. A gentleman with whom I travelled, told me that he could buy very good sound Champagne at Chalons for two francs a bottle, and was then going to purchase 100 bottles at that price, but respectable wine merchants never send any to England under three francs a bottle. What is sent to England is more spirituous, and froths more strongly than what is sold for domestic consumption. The greatest and most minute attentions are necessary in preparing Champagne. The casks in which it ferments, after running from the press, are previously sulphered to prevent the fermentation from proceeding to too great a length. It is twice clarified during the winter, and in the month of March, before the return of spring has renewed the fermentation, it is bottled off. When in this state the bottles are placed in frames, diagonally, with their heads downwards. The lees are thus collected in the neck of the bottle, but they do not consider it necessary to uncork the bottles as soon as the wine is perfectly clear, nor is it considered that there is any danger of the wine spoiling if the return of warm weather should cause a re-commencement of the fermentation, and re-mix the lees through the wine. On the contrary, they sometimes allow the lees to remain to ripen, as they term it longer than usual. The wine in general, remains in this state till the following winter, each bottle is then placed in a frame, and carefully uncorked. The contents of the neck of the bottle are emptied. It is filled up from another bottle of the same wine, and being re-corked, only now requires age to give it all the perfection it is capable of. It of course often happens, that the wine has either undergone less than the usual fermentation, or being stronger than usual requires a greater fermentation before being put into bottles; and it consequently happens that the fermentation in the bottles is greater than they can bear, and that a large proportion of them burst during the first summer. The floors of the wine cellars are all covered with grooves, sloping to a gutter, by which the wine which has burst the bottles is conveyed to a cistern in the floor, and, as there is the most perfect cleanliness observed, a part of the wine is thus sometimes saved."

From the Journal of Commerce.

GOLD MINES IN VIRGINIA.

Spottsylvania County, Va. Oct. 4th, 1834.

Having spent some time in the rich copper region of the Blue Ridge, I returned on the 4th, to the Gold mines of the United States Company in Spottsylvania county. Here I found the minors engaged in raising ore from the shaft. As soon as the ore came into daylight, gold was distinctly seen on many of the rocks; and on beating them promiscuously into sand, and washing away the lighter particles, the results of pure metallic gold was still more beautiful and surprising. I descended into the shaft about 30 feet, and after passing along in a tunnel 100 feet, I came to the vein, which, by admeasurement, was found to be 21 inches in diameter, and dipping at an angle of about 60°. I send you a common specimen of the vein, which was broken down in my presence, and which, if skilfully examined, will be found to contain from $40 to $50 per hundred weight or bushel. The whole expense of raising and working this ore is from 60 to 65 cents per hundred weight or bushel.—This company is now fully organized, and in full operation, under a charter granted by the legislature of Virginia, Jan. 9, 1834. Their mining operations appear to be conducted with economy and skill, by Capt. Rau, an experienced German miner. The excellent water power, abundance of wood and timber upon their own lands, together with the richness of their ore, render the prospects of this company uncommonly promising.

Separated only by the Rappahannock River are the Rappahannock Gold Mines, under the direction of Professor John Millington. These mines are the property of a company in Philadelphia, and although not so extensive as those of the United Sates Company, still their ores are found to

be rich in gold, and well worth working; as may be seen from the following extract of Mr. Millington's Report. "It may therefore be fairly inferred that if the experiment had been better and more accurately conducted, and made on a larger scale, each pound weight of average ore would have yielded one grain of gold, or at the rate of five pennyweights to the hundred pounds weight of ore, which is much more than the probable, or indeed possible cost of working the mines,—as we conceive that could in no case amount to so much as one dollar upon the hundred pounds weight."

I remain yours very respectfully.

F. SHEPHERD.

From the Journal of Commerce.

GEOLOGICAL DESCRIPTION OF THE GOLD REGION OF VIRGINIA.

Stafford County, Va. Oct. 7th, 1834.

In passing from tide water to the Blue Ridge, the whole country is undulating, consisting of hills of moderate elevation, intersected with vallies or rather ravines of moderate depth. The soil for the most part is composed of bright red clay, highly colored with the oxide of iron, and formed from the decomposition of vertical laminæ of Talcose slate or schist. As you approach the metaliferous veins, this red clay becomes intermixed with fragments of quartz, comminted by the action of the atmosphere, and mechanically spread upon the surface for some distance, by the action of the reins and ploughing, and the like, from year to year. At the distance of sometimes a few inches, and sometimes a few feet below the surface of this bright red soil, is found the talc or talcose slate, generally of a greenish grey color, soapy to the touch, and of a greasy lustre. This rock is the *Talkschiefer* of Germany, and is commonly known throughout the world, in gold mining districts, as gold slate, or as the slate peculiar to gold regions. It is composed of magnesia, from 30 to 40 per cent., silex from 50 to 60 per cent., and oxide of iron, allumine and sulphur, in small and varible proportions.

The leaves or laminæ of this slate are vertical, and often intermixed with iron pyrites, containing gold in a foliated form, very much like thick gold leaf. These iron pyrites are generally richer in gold, when found in the slate alongside of a quartz vein. The quartz veins are vertical walls of white flint, containing oxide of iron, and frequently iron pyrites and specular oxide of iron beautifully crystalized.

The diameter of the quartz veins, varies from the fourth part of an inch to six or eight feet. All these veins are found between and parallel to the layers of slate, and extend longitudinally in a direction 41½ degrees North East. Sometimes the gold is found in quartz veins, in large masses, and sometimes distributed through the same in fine grains, and hidden, as it were, by the oxide of iron. Frequently specimens of this kind are rich when no gold is externally visible. Sometimes the large or main vein is found to be rich, and then again, the gold is absent from it altogether. In such cases, the gold is generally found in parallel thread veins frequently at some distance from the large or principal vein. Sometimes these veins dip like coal strata, and pass under rivers and rise again; and again they are cut asunder by streams, and the rocks of the vein broken or ground to sand, by attrition, the gold washed down the stream in grains, and overspread with gravel. As these grains of gold are indestructible, they are not unfrequently carried by currents and floods down into secondary regions, where they assist in forming new sandstone, conglomerate, and the like. These deposites of gold are often very rich, and much of the gold of Virginia is obtained, by carefully washing the sand found at the bottom of the gravel in the streams and low grounds.

Other metals are usually associated with the gold in the veins and in the slate. I have never failed to find a greater or less portion of silver. I have also in some instances, found copper and blennde, antimony and galena. In many instances the sulphuret of iron or hepatic pyrites may be said to be the dwelling place of the gold.

This whole gold region is based upon granite, and evidently belongs to that formation, which Professor Blumenbach denominates the second class of primitive rocks. As yet I have not discovered that they contain any organic remains. Very respectfully, yours,

F. SHEPHERD.

ON THE CHEAT CONTROVERSY.

To the Editor of the Farmers' Register.

My present purpose is, perhaps a very thankless one; for should it prove successful, I shall deprive our brother agriculturists of a most prolific source of contention and wordy warfare; which, strange to say, is often of as angry a character, as any that the bitterest politicians ever wage against each other: I mean the apparently endless dispute about the convertibility of wheat into cheat. But the spirit moveth me to the undertaking, and I will proceed; being willing to submit it entirely to the better judgement of yourself and your subscribers to decide, whether he who attempts to appease and to terminate strife, is not, in fact, a very ill-natured man; inasmuch as he does, (should his design be accomplished) deprive others of all pretext for doing that which must be a great gratification to them, or they would not continue to do it. In performing this seemingly hopeless task, it is not my intention to furnish a solitary fact applicable to the controversy, because we have already before us thousands of what are called and considered *facts* of entirely opposite, and even contradictory character—adduced too, by as veracious men as any in our community; so that our hopes from *these*, so far as yet supplied, may truly be said to be utterly fallacious. This may possibly appear a very extraordinary declaration on the part of one professing such a design as I do; but a little reflection will satisfy any considerate man, that this curious dispute may last to the end of the world, unless some other mode can be devised for ending it, than any which has yet been promulgated—that only excepted, which you and your friends tried and published some time ago, and which, as far as I recollect, is the only one well calculated to attain its object. Had you added only a few more particular notices, you would have made your experiment so complete, as not to leave the shadow of doubt on the minds of any, but that class of incurably credulous mortals, who can believe that

jugglers actually manufacture with, and draw out of their mouths, countless yards of riband, and fry good pancakes in their hats. All the other publications that I have seen, have been the mere conclusions of the writers, from results favorable to their own preconceived notions: which they themselves choose to ascribe to causes that *might* have had no more to do with them, than the shape of last year's clouds. All that could certainly be pronounced true of these communications, was that cheat came up where the writers did not expect it; and that *they supposed*, from circumstances appearing to *them*, but to nobody else, conclusive, it proceeded from wheat plants converted into cheat by some incomprehensible process, utterly at variance with all the known laws of the vegetable kingdom. I again repeat, and challenge denial, that no experiment heretofore published, except that of yourself and friends, can be called any thing but an *ex parte* one; and such as was totally deficient in that particularity, minuteness, and accuracy of observation which are indispensably necessary to settle any such long controverted point. The champions of each opinion have utterly eschewed the admirable "non-committal policy"—they have too long been decidedly arrayed against each other on opposite sides, to yield to any thing less than a series of facts which can be neither gotten over, under, nor around. These I fully believe would be furnished by the experiment which I am about to suggest, if any persons could be prevailed upon to make it: it is hoped that several may, as neither the expense nor labor would be worth regarding in a matter about which so many persons have deeply interested themselves.

The experiment I would suggest, is that two or three gentlemen of well known respectability, should each select three or four dozen grains of the best wheat they can find. Let these be planted in well prepared land of good quality—say in two rows one foot apart, and the grains at regular intervals of four or five inches, so as to admit of hand weeding. Mark each spot carefully with a small stick, and as soon as the blades appear above the ground, scratch away the earth on one side until each grain is discovered, which will certainly show whether the supposed wheat blades really spring from the deposited wheat grains, or from something else. This being determined, let the earth be carefully replaced, and the now ascertained wheat blades be daily examined, that the wonderful transmutation may not steal a march upon the examiners, but may be detected, (if it takes place at all) at the very moment of its commencement. But as the grazing down of the blades is generally deemed necessary to insure the metamorphosis, and the bill of a goose, (I mean nothing invidious, my good sir,) has been thought particularly efficacious in accomplishing the marvellous change, let as many geese as necessary, be constantly grazed upon one half of the rows until late in the spring, and taken off only in time to enable the plants to throw out each its own head, or heads. Now as the blades of wheat and cheat are known to differ from each other, nearly or quite as much as the grain does, if the process of watching the blades, not only during the whole goose-grazing process, but until the heads appear, be continued without a day's neglect, it would be impossible for any change in the nature and appearance of any of the plants to take place without immediate detection.

If any gentlemen shall be induced to make the experiment just suggested, and in the manner above stated, and will then proclaim in your paper, under their own proper signatures, that the goose-grazed wheat actually turned into cheat, I for one, infidel as I have always been in regard to the convertibility of wheat into cheat, will publicly acknowledge the abandonment of my unbelief on this subject. I shall, however, not cease to wonder as long as I live, at such a marvellous departure from all the known laws of vegetable physiology. Indeed, I should not be more amazed were I to see realized a boast which I once heard in regard to the fertility of the Opelousas soil. Of this the boaster affirmed, that you might plant in it the over night, sow's tails, and by the middle of next day would find growing on the ends of them, fat pigs, large enough to make good roasters.

J. M. G.

[Our friend and highly esteemed correspondent, J. M. G., must pardon us for hinting that his remarks are liable to an objection very similar to that which he so justly charges to others. His tone of censure, it is true, is altogether different from that of the seemingly angry disputants whom he condemns; but his satire, however free from ill-nature or unkindness of feeling, may be as keenly felt as serious denunciation. Some persons would be more unwilling to be laughed at, than to be abused. But even if either of these courses were proper in discussing disputed points in agriculture, they would be misplaced in the "cheat controversy"—for though our own opinions are as decidedly opposed as J. M. G's., to the possibility of transmutation, yet we must admit that that side of the question is maintained by many persons, whose intelligence and experience claim and deserve, for their opinions, the most respectful attention.

The experiment proposed by J. M. G. as a means of deciding this dispute, seems far from likely to prove satisfactory. The strongest advocates of the transmutation doctrine, would expect a change rarely to proceed from *good* grains of wheat: and therefore if such experiments were repeated twenty times, without a plant of cheat being produced, it would still leave the change as much to be believed in as before. In the experiment reported in Vol. I, (p. 83) and which is referred to above with commendation, every *known* circumstance was brought into operation, which is charged to be a cause for the change of wheat to cheat. If that trial was not severe enough, let others be made more so—and those who contend for the change ought to have the liberty of choosing, and of making full use of every means for producing it. Permitting the most unlimited choice of means, and only requiring that every fact shall be strictly observed and proved, we hereby offer a *premium* of a complete set of the Farmers' Register from the commencement to the end of its publication, to whomsoever shall trace the progress of as many as three *grains of wheat* to as many perfect *plants of cheat*. Should the premium be claimed, we shall not judge of its validity, but will submit the matter for decision to others, the most competent to decide impartially and correctly as to the value of the

facts presented, and the evidence by which they are supported. The change from a single grain, if certain, would be as satisfactory as from any greater number—but three such changes are required the better to guard against possible mistakes, without adding any considerable difficulty to the operations of the experiment.]

CORN STARCH,

We are advised by an excellent house keeper, is no wise inferior to wheat starch, while it can be made with half the labor and expense. As this is the season for making it, we have obtained from our informant, for the Cultivator,

Directions for making it.—Take 30 good ears of green corn, fit for eating, grate the corn with a large grater, a lanthorn will do, into a pail of water; turn the whole through a fine metal cullender, or a coarse cloth strainer, to separate the hulls, &c. then change the water two or three times, to render the starch, which settles at the bottom, white and clean; and after the last water is removed, the starch may be cut in pieces, laid out a few days to dry, when it is fit for use, and may be kept any length of time. This quantity will suffice a year for a small family.—*Cultivator.*

From the Southern Agriculturist.

EFFECT OF MARSH-MUD ON VEGETATION.

A few days before the recent gale in August, we had about an inch thick of marsh-mud, (which had been thrown on the high ground, two months previous,) placed between five or six of the rows of an okra bed; shortly after the gale, we found the leaves dropping from every part of the okra, where no marsh mud had been placed, and nothing but the decaying stalks are now remaining. The okra had arrived at its maturity, and agreeable to the laws of nature, is decaying. But those parts where the marsh mud had been spread still remained in full and vigorous growth, and produced fruit as usual. Will some of the numerous readers of the *Agriculturist*, give an explanation of the causes of the above? Was there some property in the salt earth that produced it? Or may it have been produced by the roots having received an extra covering? May not the above fact be usefully applied to agriculture? The okra is very nearly allied to cotton, and was even placed under the same genus. May not the cotton plant be preserved from dropping its bolls at the particular season, by the timely application of marsh-mud?

From the Southern Agriculturist.

RAISING DUCKS AND TURKEYS.

In the *Agriculturist* of last year, appeared two articles, one on the best mode of raising ducks, and the other, on turkeys. Two seasons have since passed away, and the writer of this has been enabled to test the efficacy of those directions, and in every instance that has come under his knowledge, they have been attended with perfect success. The directions for raising ducks, were to feed them on animal food and keep them dry. Individuals who have adopted this plan, have sent to our markets from 500 to 700 ducks of the finest kinds, and they have had no diseases among them, and found no difficulty in raising them.

Two or three individuals who tried the experiment of driving their turkeys, when young, to a distance from the house, where the greatest number of insects were to be found and feeding and housing them in the manner directed in the Agriculturist, have stated, that they have raised from 100 to 300 turkeys, and have pronounced it to be a method, which of all others, they believed best calculated to be attended with success.

[Some of the experiments cited in the following epitome have already been presented to the readers of the Farmers' Register in a more extended form.]

From the Cultivator.

BONES, HORNS, &c. AS MANURE.

Bones are in great demand, in Great Britain, as a manure; and great quantities are annually imported into that kingdom, from the continent, for this use. They are broken in mills constructed for the purpose, and often upon the farm, by the laborers. Bone dust ordinarily sells at about 2s. or 44 cents, and sometimes as high as 3s. 6d. per bushel; and at this price it is generally found to be a more profitable application than common dung. Bones are frequently applied, and by many preferred, when broken in half or three quarter inch pieces, and sometimes when of larger size. Their durability is in proportion to their size; the smaller they are crushed or ground, the sooner their fertilizing properties are exhausted—and the less the quantity required to be applied. They have been applied in various proportions; though the ordinary dressing is from 20 to 40 bushels per acre; a heavy dressing does not produce corresponding benefits, and in most cases, no additional benefit. Two bushels of crushed bones are deemed equal to a load or ton of manure. The uncrushed bones are sold at about 42s. or from nine to ten dollars the ton. Their quality is not considered to be impaired by their having been boiled. Bones are applied as a top-dressing to grass, and harrowed in with the grain in tillage crops. The following results are selected from a great many, to illustrate the benefit and economy of bone manure.

On the estate of Garrowby, in Yorkshire, the crops of turnips had dwindled to nothing; by the application of 12 to 20 bushels of bone dust per acre, in drills, the crops have become excellent, and the following crops are very considerably improved.

At Clumber Park, 600 bushels, spread upon 24 acres of pasture, a dry, sandy and gravelly soil, doubled the product, in butter, of the cows pastured upon it, over those fed upon pasture not boned.

Mr. Watson, of Riellor, applied 25 bushels of bones to an acre of turnips, and 25 loads of manure to an adjoining acre. The dunged acre yielded 22 tons; that dressed with bones 28 tons.

Mr. Graburn manured part of a field with crushed bones, at the rate of 30 bushels the acre, and another part with eight loads of dung, and repeated the dung the two following years upon this part. The turnips, wheat and grass, which constituted the three crops, were better upon the part once boned, than upon that thrice dunged.

Thirty-four acres of sandy soil, on the estate of

Sir Charles Thockmorton, were half manured with bones and half with dung. The first gave the earliest and best turnips; the barley which followed yielded five bushels the acre more than the dunged part, and the clover was also heavier upon the boned part.

Capt. Ogilvie applied bone dust at the rate of 15 to 20 bushels the acre, to a light sandy loam, and after the experience of five years upon a series of trials, he found all the successive crops of turnips, barley, and grass, decidedly superior to those which had been previously produced by other manure.

Twenty bushels of bone dust, at 2s. 6d. would be 50s.; 20 loads of manure at 10s., the price given in the statements, would amount to 200s., which shows a saving of three-fourths in manuring an acre with those substances, at the assumed prices, and in the assumed quantities.

The two following cases, taken from the Doncaster report, are worthy particular notice.

1. "On a field, part of which was boned 40 years ago, the crops were, on that part, during fifteen or sixteen succeeding years, visibly better than the remainder, although the land was all of the same quality, and the part not boned was manured with barn-yard dung.

2. "In another case, about three acres of light sandy land were dressed, in 1814, with 150 bushels of bones per acre; since which time the land is said never to have forgotten it, but is nearly as good again as the other part, farmed precisely in the same way, with the exception of the one application of bones."

As to the size in which bones are most profitably applied, one of the Doncaster Association remarks—"That if he meant to till for early profit, and if he wished to keep his land in good heart, he would use half inch bones; and, in breaking these, he should prefer some remaining considerably larger: that by using bones of a large size with dust in them, there must be sufficient of the small particles of the dust to set the turnip crop forward, and sufficient of the large particles of the bone left to maintain the land in good condition for the subsequent crop.

Bones are found on analysis to contain, in 100 parts, 40 of earthy and saline matter, 40 of cartilage and jelly, and 20 of fatty matter. The soft parts thus form, in the best bone about sixty, and upon an average about fifty per cent. which are almost entirely constituted of the same elements as plants, and all of them, sooner or later, liable to be dissolved and absorbed by the roots.

Bones should undergo a partial fermentation before they are applied, in order to produce the best immediate effect. This is done by mixing them with yard manure, or with manure and earth. They have also been mixed and applied with coal ashes with effect and economy.

The Doncaster Agricultural Association, after long experience in the use of bones, have published rules for its application, from which it appears,

That on dry sands, limestone, chalk, light loams, and peat, bones are a very highly valuable manure.

That they may be applied to grass with great good effect.

That on arable lands they may be laid on fallow for turnips, or used for any of the subsequent crops.

That the best method of using them, when broadcast, is previously to mix them in a compost with earth, dung, or other manures, and let them lie to ferment.

That if used alone they may be either drilled in with the seed or used broadcast.

That bones which have undergone the process of fermentation are decidedly superior (in their immediate effects) to those which have not done so.

That the quantity should be about 20 bushels of dust, or 40 bushels of large, increasing the quantity if the land be impoverished.

That upon clays and heavy loams, it does not yet appear that bones will answer. [*See No. 55 Farmer's Series.*]

And where, it will be asked, are we to obtain bones to enrich our lands? Every farmer, we admit, cannot obtain them; but those who are located in the neighborhood of villages and cities may obtain a considerable supply. There are two bone mills already established on Long Island, and it is understood the proprietors find a ready market for all they can crush. During the last year we purchased sixty horse-cart loads from one man. We had them crushed in a plaster mill; and when about to use them, mixed them with house ashes, and wet the whole plentifully with water. In 48 hours, fermentation having sufficiently progressed, they were applied to turnips, barley and corn; and though we cannot yet speak of their ultimate benefits, they so far confirm the highest opinion entertained of their utility.

We have had some years experience in the use of horn shavings and horn piths, which are procured from the comb manufactories. The first, of which we have used many hundred bushels, are equal, if not superior, to bone dust. The piths are cut into pieces, upon a block, and buried with the plough. Of these we used 15 loads last spring, upon corn ground, and we think we have not seen a finer crop than is now growing there.

From Chambers's Edinburgh Journal.

THE INVISIBLE ANIMAL WORLD.

In whatever direction we turn our eyes, we every where see around us the most surprising indications of universality of life. The principal of vitality seems to be scattered with the utmost prodigality over and throughout the whole of the inanimate creation. On the earth, in the air, in the rivers and seas, in all places and in all times, we find life. And in what an astonishing variety of forms and combinations! Reckon up all the varieties of animated creatures from a man to a midge, from a whale to a herring, from an albatross to a humming bird; take the human, the brute, the bird, the reptile, the fish, and the insect creation, and compute the supposable number of individuals in each; and after all that we can count, all that we can allow to be in existence, we are yet but beginning to begin to sum up the amount of creatures whom the Creator in his almighty power has endowed with that incomprehensible principle—life. The deeper we examine, the more lofty are our conceptions of this infinitude of living creatures. Astronomers, by means of their telescopes, have told us of the bodies which dot the firma-

ment, and given us reason to believe that there exist millions of worlds inhabited by beings which must vary in their forms and properties according to the characteristics of the spheres they inhabit. But to bring down our imaginations from the contemplation of so vast a field for conjecture, we are attracted by the discoveries of the microscope, and find, by the attestation of our senses, that in a single drop of water there are myriads of animals—atoms—creatures, of which it would require nearly a thousand millions to form a cubic inch, all recreating and executing their various functions and evolutions with as much rapidity and apparent facility as if the range afforded them were as boundless as the ocean. Where is the man who can contemplate this scene of busy enjoyment, and not be overawed by the majesty of the works of nature, and not adore the hand that has, in such lavish beneficence, scattered the principle of life throughout every department of creation.

Until within the last fifty years, hardly any one was aware of the existence of animalcules; that is, small animals invisible to the naked eye, living in water, and in matter of various kinds. It has also only been within a very recent period that this branch of natural history has assumed a regular form; and though a classification has been in some measure effected, from what we can learn, the science is still in a very imperfect state. When we are made aware of the characteristics of the animalcule world—for it seems entitled to this term—it does not appear astonishing that even the most patient investigators, assisted by the most powerful magnifying glasses, should be at a loss to arrange in distinct orders the apparently innumerable and ever-changing classes.—Animalcules bear no resemblance whatever to animals which we can see with the naked eye. They are of all imaginable shapes; their figures resemble round balls, ovals, eels, snakes, corkscrews, funnels, tops, cylinders, pitchers, wheels, flasks, purses, semicircles, kidneys, dots with tails, tobacco pipes, flowers, branches of trees, eggcups, and some have the appearance of a tulip with a flowery bulb and stalk. But their figures are so extraordinary, so infinite, that it would be quite impossible to give the least idea of them by description. One thing is tolerably obvious: they all possess forms suitable to their peculiar mode of living. If they have to seize their food by darting, they are given a shape in consonance with that object. If they live by creeping, or swimming slowly, they are of a more inert figure. In these respects, therefore, nature has paid the same degree of attention to the construction of animalcules as it has done with larger animals.

The apparently incalculable number of forms of animalcules is not more puzzling to the investigator than their assumption of new forms.—Most creatures that we know of produce young after their kind, either at once bringing forth their progeny in life, or through the medium of eggs, but always producing young resembling themselves in figure. Animalcules, however, have generally a different way of coming into existence. One class propagate by spontaneous scissure, or division of their bodies into two or more portions, each one forming a new creature, which, on its arrival to maturity, pursues the same course. In thus cutting themselves in pieces, they are very capricious in their fancy. Sometimes they divide straight across, sometimes lengthwise, and sometimes diagonally; and what forms the chief difficulty in understanding them, the pieces so separated do not resemble the original: an animalcule resembling a ball will give birth—if this word can be properly applied—to a number of triangles. Another class of animalcules propagate by the distribution of the internal substance of the parent, of which nothing is left but the envelope, soon to be dissolved; a third class are produced from germs; shooting out from the sides of the parent; and most likely there are many other ways by which they come into life, of which naturalists have yet no knowledge. In some instances, animalcules appear to live in shells, which are bivalve, and open and shut at pleasure.

Notwithstanding the searching power of certain kinds of microscopes, it would have been difficult to ascertain the functions of animalcules without the aid of coloring matter. Into the water in which they abound, coloring vegetable matter, which supplies them with food, is introduced; and being partaken of, the internal structure, now transparent with color, is discerned. By this contrivance, it has been discovered that animalcules possess distinct viscera or digestive organs, and which are of various kinds. Most descriptions of these creatures are furnished with a species of hairs bristling out from parts of their bodies; these bristles seem to serve the purpose of fins to give locomotion, and they also act the part of arms to agitate the water, and cause a current to flow towards their mouths. They are also provided with hooks, by which they can attach themselves to any object. Independently of these peculiarities, some animalcules possess the extraordinary faculty of thrusting out or elongating portions of their bodies at various points, which, assuming the appearance either of legs or fins, are termed variable processes, and enable the creature to walk or swim.

To those who wish to be informed of the already known orders of this wonderful department of nature's handiwork, we would recommend a perusal of the recently published work of Andrew Pritchard, Esq., entitled. "The Natural History of Animalcules." In this interesting production, which has afforded us matter for some of our present observations, the author describes the following as the best method of procuring animalcules whereon to make examinations: "In the selection of vegetable substances for infusions such as stalks, leaves, flowers, seeds of plants, &c. care must be taken that there be no admixture of quinine in them or the intention will be frustrated. Immerse these, whatever they may be, for a few days in some clear water, when, if the vessels which contain them be not agitated, a thin pellicle or film will be discerned on the surface, which, under the microscope, will be seen to be inhabited by several descriptions of animalcules: the first produce are commonly those of the simplest kind, such as the Monads. In a few days more, their numbers will increase to such an amazing extent, that it would be utterly impossible to compute those in a single drop of the fluid. After this, again, they will begin to diminish in numbers, and I have generally observed them supplanted by others of a larger species and more perfect organization; such as the Cyclidia, Paramesia, Kolpodæ, &c. It is worthy of remark here, however, that in their production

they do not pursue any regular order, even in similar infusions. If the vessel be large, and the circumstances under which it is placed sufficiently favorable, a still higher description of animalcules will succeed, viz. the Vorticella, and, lastly, the Brachioni; and thus a single infusion will repay for the little trouble of making it, with a great variety of species. Water in which flour has been steeped will be found to abound also with animalcules; and it is remarked by G. Leach, Esq. that the leaden troughs constantly appropriated for birds to drink out of, contain several descriptions of them, and more especially those of the wheel genus. In ponds, too, especially in the shallow parts, near their edges, and in the immediate vicinity of water plants, prodigious quantities of all kinds may be easily procured; so that, possessing as we do such myriads of them around us, that they impregnate almost every thing that we eat and drink, touch and breathe, an anxiety to know more about them, and the effects they produce, cannot but be regarded as rational and laudable."

It appears, also, by the investigations of other inquiries, that animalcules may be produced by any species of decomposition, whether of vegetable or animal substances. It would almost seem, from what is related, that the whole of the vegetable and animal kingdoms are but compounds of matter resoluble into these extraordinary minute creatures. An idea of this kind is by no means new, and it will perhaps be remembered that Buffon tried experiments to prove its accuracy. "To discover," says he, "whether all the parts of animals, and all the seeds of plants, contained moving organic particles, I made infusions of the flesh of different animals, and of the seeds of more than twenty different species of vegetables; and after remaining some days in close glasses, I had the pleasure of seeing organic moving particles in all of them. In some they appeared sooner, in others later: some preserved their motion for months and others soon lost it. Some at first produced large moving globulous resembling animals, which changed their figure, split, and became gradually smaller; others produced only small globules, whose motions were extremely rapid; and others produced filaments which grew larger, seemed to vegetate, and then swelled and poured forth torrents of moving globules." The subsequent examinations of physiologists have, in a great measure, determined that these moving globules of Buffon, or molecules, as they are scientifically termed, are the primary atoms of which plants and animals are composed, although, at the same time, we are not yet beyond the regions of conjecture with respect to how these molecules, or animalcula are either brought into substantial consistency, or how they are developed by the separation of matter during the putrefactive process. So intimately does the vegetable, in its earliest rudiments, sometimes bear an analogy to animal life, that it is occasionally difficult to separate them: it is at least certain that the commencement of the vegetable process is some way connected with the existence and operations of molecules. "Having, at the request of Dr. Linnæus (says Mr. Ellis, a writer in the Philosophical Transactions) made several experiments on the infusion of mushrooms in water, in order to prove the theory that these seeds are first animals and then plants, it appeared evidently, that the seeds were put in motion by very minute animalcules, which proceeded from the putrefaction of the mushroom; for by pecking at these seeds, which are reddish, light, round bodies, they moved them about with great agility in a variety of directions; while the little animals themselves were scarcely visible, till the food they had eaten discovered them. The satisfaction I received from clearing up this point, led me into many other curious and interesting experiments. The ingenious Mr. Needham supposes these little transparent ramified filaments, and jointed or coralloid bodies (strung like coral beads) which the microscope discovers to us on the surface of inert animal and vegetable infusions when they become putrid, to be zoophytes, or branched animals; but to me they appear, after a careful scrutiny with the best glasses, to be that genus of fungi called *mucor*, or *mouldiness*. Their vegetation is so amazingly quick, that they may be perceived in the microscope even to grow and feed under the eye of the observer. Mr. Needham has pointed out to us a species that is very remarkable for its parts of fructification. This, he says, proceeds from an infusion of bruised wheat. I have seen the same species proceed from the body of a dead fly, which has become putrid by lying floating for some time in a glass of water where some flowers had been. This species of mucor sends forth a mass of transparent filamentous roots, from whence arise hollow stems, that support little oblong vessels, with a hole on the top of each.—From these I could plainly see minute globules or seeds issue forth in great abundance, with an elastic force, and turn about in the water as if they were animated? Continuing to view them with some attention, I could just discover that the putrid water which surrounded them was full of the minutest animalcula; and that these little creatures began to attack the seeds of the mucor for food. This new motion continued the appearance of their being alive for some time longer; but soon after, many of them arose to the surface of the water, remaining there without motion; and a succession of them afterwards coming up, they united together in little thin masses, and floated to the edge of the water, remaining there quite inactive during the time of observation."

The celebrated botanist Dr. Robert Brown, also entered into experiments of this nature, with the view of identifying the rudiments of vegetable with animal life, which he successfully accomplished. He found that the pollen and tissue of plants were the constituent or elementary molecules or organic bodies. "On examining," says he, "the various animal and vegetable tissues, whether living or dead, they were always found to exist; and merely by bruising these substances in water, I never failed to disengage the molecules in sufficient numbers to ascertain their apparent identity in size, form, and motion, with the smaller particles of the grains of the pollen. I examined also various products of organic bodies, particularly the gum raisins, and substances of vegetable origin, extending my inquiry even to pit coal, and in all these bodies molecules were found in abundance."

Of late, very considerable improvements have been made upon microscopes, by which much interesting information regarding the habits and character of animalcules has been afforded. These microscopes are of immense power in magnify-

ing; and by a contrivance for throwing the light of a bright lamp, of the sun's rays, or of oxy-hydrogen gas, upon the object to be investigated, most astonishing discoveries are made. Mr. Pritchard recommends his Achromatic Engiscope as having certain decided advantages over any other description of the microscope. To the student of nature there could not be presented a more boundless and luxuriant field for useful inquiry than is held out by these powerful instruments, and it will be allowed that in no other department of science is there to be found such a delightful source of leisurely recreation. To the man of humble means we can recommend no better or more rational amusement than a visit to one of the many microscopical exhibitions now to be seen occasionally in every large town, and which cannot be too sufficiently pressed upon public attention.

From the Norfolk Beacon, Oct. 31.

PORTSMOUTH AND ROANOKE RAIL ROAD.

All our readers are aware that the line of the *Portsmouth and Roanoke Rail Road*, between the former place and Suffolk, has been completed some time since, and that the cars for the conveyance of passengers and produce run regularly between the two points twice a day.

We have now to inform them that the grading of the remainder of the route has been contracted for to the distance of about ten miles on this side of Weldon.

The rails designed for the road between Suffolk and the Nottoway—a distance of about 24 miles, are laid along the track; but considerations of prudence, which we are pleased to see, induced the directors of the company to prevent their final adjustment, until the embankments shall have been rendered firm by the rains of the winter. We further learn that some purchases have been made of the land through which the road passes beyond the Nottoway; but that some of the land holders were so exorbitant in their demands, that the directors have deemed it advisable to submit the case to the decision of commissioners, according to the terms of the law. We regret that such a disposition should have manifested itself at this time of the day; the rail road will enhance the value of the land through which it runs a hundred per cent. Such a policy reminds us of the man who charged a friend with a night's lodging, who called to present him with a thousand pounds.

We can, nevertheless, congratulate our friends on the steady progress of the work. Every day the improvement is winning new friends, and confirming the old. Now and then some new obstacles may gather before us; but the goodness of our cause will bear us beyond them. And it is almost reduced to a certainty, that within twelve months from this date, the entire route to Weldon will have been completed; and the Portsmouth and Roanoke Rail Road will demonstrate the successful enterprise of our people.

From the Charleston Mercury.

CHOLERA FACTS.

Since the 12th instant there have been no cases of Cholera on the Savannah river, either in the city of Savannah, or on the plantations. The term of its continuance from the first case on the 1st of September, was therefore 42 days. The usual term is 57 days.

In the city of Savannah there have been in all so few cases, that the disease can hardly be said to have prevailed there as an epidemic. The immediate site of Savannah is high and dry, to which may be attributed its comparative exemption.

On the river plantations the aggregate number of deaths is computed to have been 700, being a proportion of about one to six of the population. The proportion varied, being more or less upon different plantations. In some settlements it was as great as one to three and four. In New York the proportion was one to twenty-eight.

That our planters should not in case of the recurrence of the disease, be induced, by the temptation of saving a portion of their rice crop, unwittingly to expose and sacrifice the lives of their slaves, it should be borne in mind that those negroes who are kept at their field work, are more liable to be attacked than others. A planter with whom we have conversed on the subject, attributes the reappearance of the disease amongst his negroes, and its going through his entire gang, to the fact of his having continued harvesting, although the workers returned to the pine woods every day before sunset, and were not sent out to work before sunrise. It was thought that avoiding exposure to the night air in the swamps, would exempt them, and we so stated at the time; but it proved otherwise, and although from being promptly and well attended, they nearly all recovered, yet he is convinced from circumstances, that it was the field work which brought on the disease when it reappeared. This fact is in accordance to what is stated concerning the Asiatic Cholera, in the recently published history of British India;—viz: that laborious occupation in the open air was found to be the most potent predisposing cause, and that soldiers after a long march, travellers after a fatiguing journey, and the natives who cultivated the field were the first and usual victims. In the same camp the Cholera would break out and rage amongst the men who had marched, and spare those who had rested. The Europeans, whose pursuits kept them within doors, generally escaped. We learn that in many of the last cases on the Savannah river, the solution of sugar of lead was administered by Dr. Scriven, with decided success, and proved effectual in allaying the internal irritation and checking the diarrhœa.

From the London Literary Gazette.

CONVERSION OF SALT WATER INTO FRESH.

On Monday week we witnessed a completely successful and a very important experiment, made by Mr. Wells, the patentee, in the conversion of salt sea water into a perfectly fresh and pure liquid, fit for every purpose of domestic use and economy. A barge was moored in the Thames near Westminister bridge; and a number of naval officers and scientific gentlemen were invited to inspect the process. The sea water was brought from off Ramsgate, and fully impregnated with the same principle; some of it was in very impure and dirty condition. The apparatus invented by Mr. Wells consisted of a cast iron cooking machine; a cube on a comparatively small scale, especially when we looked to the extraordinary utility of its opera-

tion. It seemed about four feet in height and the same in width; and contained ovens, 'roasting fire,' pots, pans, kettles, &c. &c. &c., sufficient to dress a dinner for seventy or eighty men. The consumption of fuel is very small; about two bushels, we are told, in 24 hours; and yet, by the internal application of the heated air, by means of spiral and circular tubes surrounding the various parts of the machine, roasting, boiling, and baking were carried on with the utmost regularity and precision. Here alone would be a valuable addition to the conveniences and comforts of life, whether ashore or afloat; and, even without the far greater improvement yet remaining to be decided, would entitle Mr. Well's invention to high encomium and general adoption. Whilst the cooking is proceeding, the sea water is gradually supplied from a cask or tank, as may be most ready, and, passing into the interior of the machine, is there submitted to distillation. In its distilled state it then flows into a pipe of cast iron, or of copper tinned, which pipe is led over the bow of the vessel and along the cut water into the sea; and thence along the bottom of the ship till it returns into the hold with a common stop cock to draw off the water. The grand improvement in this, is the making the element in which the vessel floats the condenser of the altered liquid which runs off at the rate of about a quart a minute, perfectly fit for drinking, for washing, and for every other purpose for which fresh water is employed.

We tasted it both before and after undergoing the process, and we used soap in washing our hands with it; and we can truly declare, that in the first instance it was sweet and palatable, and in the second soft and pleasing. The patentee, however, proceeds to filter it through charcoal, in order to restore the carbon which is lost in the distilling, and you have the pure and sparkling element, equal in every respect to spring water. We have thus minutely stated what we saw and tasted; and we do so with great satisfaction, since it is hardly possible to imagine any economic discovery of such vast importance to the navy and to the nation. All the watering of ships rendered unnecessary, and the ocean itself converted into one abundant and everlasting fountain of supply, forms indeed an epoch in the history of navigation. We need here no more of the sufferings of brave and hardy sailors, from the want of this essential article of human subsistence. The room required in merchantmen for the stowage of water for the voyage, may now be filled with goods of any kind. In fine, it would be difficult to overrate the value of this admirable invention, which, there can be no doubt, will be speedily and universally adopted and will we also trust amply reward the inventor of a benefit to his country and fellow creatures, the worth of which can hardly be excelled in the annals of useful humanity. The sea water around a ship is incessantly converted into excellent fresh water, fit for every purpose, and the ocean itself is made the chief agent in this metamorphosis. It is a great and wonderful achievement.

SAVING PEAS AND BEANS FROM MICE.

Chop up the tops of last year's shoots of furze, and sow them in the drill.—*Gardener's and Forester's Record No.* 3.

From the National Intelligencer.

NEW USES OF CAOUTCHOUC, OR INDIA RUBBER.

Messrs Gales and Seaton:—During a late visit of business to the Eastern States, I took an opportunity of examining some of the many public and private improvements made in various places, and as they all have reference to our comfort and convenience, I would take the liberty, through your paper, of giving a brief account of them.

The long known and valuable properties of the Caoutchouc, or India Rubber, has occasioned many attempts to convert this gum into its original or fluid state so as to enable it to be applied as a coating to various surfaces, when its utility would be made more manifest; but the effort long proved unavailing, to any extent, until lately, when the fortunate discovery of a cheap solvent was made by —— ———, of Boston. The value of this discovery was duly appreciated by the citizens of that city, for a company was soon after formed to enter largely into the manufacture of various articles coated with this gum, and when I visited the factory, it was in full operation, and very extensively patronized.

"The Rubber Factory," as it is called, is situated in Roxbury, a beautiful village about a mile from Boston, and embraces several buildings. One of the proprietors, Captain D———, to whom I had a letter, was fortunately present, and kindly went through the whole establishment with me, except one room, which contained the secret of the mode of dissolving the gum elastic, only known to the inventor, who now has charge of the factory. He prudently reserves to himself the exclusive right of working up the ingredients, the secret being under seal and deposited in bank, in case of the inventor's death. The first room we entered was the lady's shoe factory, where numbers of prunella shoes were making, without the use of either needle or thread, the tops, bottoms, and lining, all cemented together with the rubber. These shoes were of the handsomest shape, and warranted to be completely water proof.

This improvement promises to be a valuable acquisition to the ladies, as they suffer much by wearing shoes that are pervious to water. I was informed that these shoes would last out three pair of the common prunella, and would cost no more.

The next room we entered was the garment factory, where we saw a number of girls cutting out various garments, coats, jackets, pantaloons, &c. and putting them together without thread or needle; the coating of rubber, which they had, forming a perfect cement to the seams. Others were making an article which will be very acceptable to mothers and nurses, namely, waterproof aprons, some of them handsomely ornamented and with pockets.

The third room we visited was filled with men's garments; coats, pantaloons, overcoats, capes, life-preservers, and many other articles, all finished and ready for sale. Here persons may fit themselves with complete suits of waterproof clothes: the sportsman will here find the means to enable him to wade through water and mud without fear of getting wet; the weather beaten mariner, the watchman, coachman, fisherman, may now bid defiance to wet or cold, if ensconced in these waterproof robes; and shipwrecked sailors and others, cast upon the mighty deep, if girt with these life-

preservers, may ride secure upon the mountain wave; and if clad also with waterproof garments, be doubly secure. When Mr. Durant, the celebrated æronaut, descended in Boston Bay, he took the precaution of girding himself with one of these life-preservers, and to this he said, he owed his safety when he fell into the water.

Several of the steam boats are furnished with these life-preservers, and they serve the additional purpose of a pillow to lay the head on, as they may be folded. They are made to buckle round the waist, being previously inflated, and as they are air, as well as water proof they will remain in that state as long as you may desire.

This is a most valuable article for our public ships, packets, steam boats, and other vessels to possess, in case of shipwreck; as by this means many valuable lives might be saved, which otherwise would be lost.

In one of the buildings up stairs, we found them manufacturing hose for fire engines; small pipes for conducting water above ground, traces for carriages, &c. This hose is made of stout duck, coated with the rubber and cemented with the same; so that neither needle or thread are used. It may be made of any strength as you may treble the thickness of the duck. It promises to supercede the leather hose, being considered more pliable, perfectly watertight, and not so apt to be injured by being trodden upon. I could not but admire the ingenuity of the contrivance of a substitute for the roller to preserve the rotundity of the small pipe, namely, by pumping air into the cavity as they proceeded, so as to keep it expanded. These pipes being made of several thicknesses of duck, remain of a cylindrical shape after being finished.

It is impossible to say to what useful purposes this elastic gum will be applied; it has opened a new era in the arts of life, and from its pliant nature, it must, in many cases, be substituted for leather. To all who are exposed to wet or cold, it proves a safeguard, and its economy is equal to its utility, for at this factory a person may clothe himself in a suit of waterproof garments, of a handsome exterior appearance, for the small sum of eleven dollars.

R. M.

GAMA GRASS.

To the Editor of the Farmers' Register.

A good deal of interest having been elicited by some communications which appeared on gama grass in the first volume of the Farmers' Register, I have thought it might not be amiss to offer a word on that subject. About the 15th of May last, I had occasion to visit in the county of Halifax on Dan River. I found that the gama had been long known on that river by the name of *fox-tail*, that it had been used as food for stock on a small scale, and that it grew spontaneously and luxuriantly wherever it had a fair chance. I was informed by one gentleman that he had cut a small quantity for hay, and that he intended to plant, or had planted, a small meadow of it. I saw it growing in land of ordinary quality—it had attained the height of more than three feet, without the appearance of a seed stalk. On the 18th instant, I accidently came across two tufts of it growing on a red clay bank on my own farm, which I cut and weighed. Each tuft covered a space of about a foot in diameter, and they weighed together twenty pounds, after having dropped nearly all the seed, and many of the blades had dried up. The fodder appears to attain its full growth before the seed stalk springs from the root. The blades on the bunches cut, were four feet six inches high, and the seed stalks about six feet six inches. I afterwards found many tufts of it growing on a galled hill-side that had been suffered to grow up in the common shrubbery: on this land, too poor to grow a medium crop of corn, it grew to the height of from four to six feet. I cannot undertake to speak of the merit of this grass as a food for stock. When I rode up to a bunch, my mare eat it with great avidity, and seemed to give it the preference to other grasses that were equally in reach. From the specimens I have seen, I should think it well worth cultivation, for litter for our farm-pens and stables. But if stock will eat it at all in winter, it must be valuable, since no grass I have ever seen can compare with it in luxuriance. It is to be hoped that the judicious and intelligent farmers of this section, will make a fair experiment of it, before they condemn it. It is certainly a coarse grass, but not more so than the ox-grass, which is a good grass if cut early. In this section of the country, where tobacco is the staple, every thing that promises to add to the sustenance of man or beast, ought to be regarded as worthy of attention. If I can possibly find leisure, I shall plant a small spot with the roots, with a view of ascertaining its value as a meadow grass, and make known the result.

September 30, 1834. C.

Sir—I am instructed by the "Charlotte Agricultural Society," to forward the enclosed communication, (read before the Society,) with a request that you will publish it in the Farmers' Register.

Very respectfully, yours, &c.

A. C. MORTON,
Sec'y of the Society.

Charlotte Nov. 1, 1834.

ON THE MANAGEMENT OF HORSES, MULES, AND MANURE.

The management of the teams of mules and horses, and raising manure, are subjects that deserve and ought to receive great consideration. The capital to keep up good teams on a plantation, together with the annual expense of supporting them, form so great a portion of the charges of keeping up the estate, that no estate however well managed in other respects, can endure for fifty years extreme bad management of the teams, much less when neglect in raising manure is added to it. The good management of teams is often the most obvious cause of the thrift, and increase of wealth of the planter. To their bad management, may justly be charged in many cases, the waste and ruin of the estate. I take up the subject with the full knowledge that I shall not do it justice; but with confidence that I shall call the attention of other members to the subject, who will be able to do more justice to it, and put all to reflecting on its vast importance. The constitution of a horse is said to be very much

like that of a man. He requires a pure air, good water, sound sweet food, and good exercise. He cannot be in full possession of his powers, if either of the above things be wanting. The mule is very much like the horse in constitution. He can endure coarser fare. In addition to the labor of the horse and mule, their dung is valuable as manure. Their management should therefore be such as to get from them the greatest quantity of labor, consistent with their health and longevity, and also consistent with making the most of their manure.

The stable should be situated on a high, dry, and airy place, and if the estate admits of it, on a gray or sandy soil. I should prefer stables built like the stables for race horses, in rows of single rooms, about twelve feet by ten for each horse, with a rack, and a manger that will hold one and a half bushels. The pitch of the stable should be ten or eleven feet, so as to give a plenty of air. I should prefer stables made of logs, notched down as close as convenient, the cracks that remain left open. If the stable is made otherwise, so as to let several horses in the same door, for double rows of stalls, the stable for six horses should be 28 feet long, 18 feet wide, and 12 feet pitch, and with a dirt floor. The stalls should be planked from the floor close to the top. The stall should be 7½ feet long, the hind part about 4½ high, the front reaching to the top of the rack, and the floor so levelled and inclined, that the urine will run out of the stalls into the passage, and from the passage out on each side of the house. The horse or mule to be fastened in his stall, by a chain with a leather strap around his neck. This is cheapest: the strap will last ten years, the chain forever. Ropes will cost less, but must be renewed annually. I object to several horses being loose in the same stable together. Some good managers in other respects, do this. The horses bred together may be quiet and disturb each other but little. But generally, when several horses are loose in the same stable together, they disturb each other; and this is more certainly the case with mules. A single restless horse or mule, will deprive all in the stable with him from rest and sleep. Each horse has not only to contend with his own, but with the accumulated filth and stench produced by all the rest. This of itself is an insuperable objection.

Again, it is impracticable to allowance each horse or mule with food, when fed in common with others. With the stable should be enclosed from one-quarter to one-half acre of land, covered with turf, and having good shades, and kept as clean and dry as possible. There should also be enclosed another lot adjoining, of several acres, with water, grass, and shade, and in addition, at one side of the small lot a place should be enclosed to carry the dung from the stable: and a shelter to put it under, would be well worth the labor and expense. The stable should have a supply of old spades, or shovels, pronged hoes, forks, &c. and for each pair of mules or horses, a wheelbarrow, and a good curry comb and brush. As our stock of cattle eat all the straw, we have no litter for beds for our horses, except leaves from the forest. A supply of them should be hauled from time to time, and placed in a pile near the stable, and each night the ploughman should put in a good bed to each of his mules or horses, and the next day carry out the whole contents of litter, dung, &c. down to the dirt of the floor; and carry it in the wheelbarrow to the manure pen, and cover it over with leaves, large piles of which should be kept in the manure pen for the purpose. The whole labor of placing the bed at night, and cleaning out the stable, and carrying the contents the next day to the manure pen, will not occupy the ploughman (there being one to each pair of mules or horses) more than from three to ten minutes. This mode of proceeding will prevent his horses from being stuck up with their own filth, and will enable the ploughman to keep his horses clean with great ease. The usual mode of putting on leaves for the bed of a horse on dung and litter wet with urine, and continuing for a week or more at a time, will destroy the powers of a horse. The stench that rises in such a stable is most unwholesome, and when the heat and fermentation has commenced in the litter under the horse, no matter how well it may be covered by fresh leaves on the top, the steam that rises from it will sicken and debilitate the horse, and often produces scratches and surfeit. In damp warm spells of weather, you will often find the horse smoking with sweat when lying in such a stable. Add to this the lot enclosed, with the stable covered deep with leaves in autumn, and then cattle fed upon it, and all the dung from the stable mixed with this, and a spell of wet weather upon it—no other place out of this filthy stable for the horse to roll and cool himself at noon and night, when he comes in from his work; and take into consideration the labor of the ploughman to clean a horse thus exposed to filth. This mode of treating the plough horses is very commonly pursued, from a belief that it is necessary to tread and mix up the dung from the stable with the leaves in the stable yard, in order to make manure. There never was a greater mistake. Such a course is totally inconsistent with keeping the mules and horses in health and good condition. No feeding and rubbing can keep them up under hard work in such filth and stench. The course is equally inconsistent with preserving the manure. It is held to be a great evil by Sir H. Davy, that wheat, barley, and other straw, is too long to be mixed with the soil and ploughed in, before it has undergone fermentation, as in the process of fermentation it loses its very essence as a manure. He thinks that machines for cutting it short enough to mix in the soil with a plough, might be afforded. This objection does not lie to the leaves, as they are short enough to mix with the soil.

I refer to Sir H. Davy's book on Agricultural Chemistry, Lecture VI. page 184, to prove that vegetable manure should be mixed in the soils before it has fermented, and that it should be kept as dry and cool, and free from exposure to the air as possible. The erroneous practice of spreading leaves and mixing dung, and treading with horses and cattle, cannot be supported by reason or authority. It clearly wastes every thing valuable as a manure about any vegetable substance. This would strike every man at the first blush, when applied to tobacco as a manure. Tobacco, we all know, is one of the strongest vegetable manures. Who does not know that its substance would be wasted by laying it on the ground from November to April, and exposed to the rains and treading of cattle? The same process will injure an oak leaf, not quite as much, because it has a stronger fibre.

The corn stalks, it is admitted, should be trodden: they cannot be converted into manure and mixed with the soil otherwise. The oxen and other cattle can generally manage the whole of them. If, however, the horses are to be fed with, and to tramp a part of the corn stalks, let them be placed in the dung pen in the fall, before any manure is carried into it, and let the horses into that pen till they have subdued so many of the stalks as is allotted to their share; then pile them up, and during the balance of the winter, throw the dung from the stable and leaves with them, and covering the whole from time to time, as stated above.

As to the feeding of horses and mules, we generally labor under two mistakes. The one is, as to the quantity of grain—the other is, that a plough horse or mule cannot eat too much dry long forage Horses or mules should never eat as much corn as would produce the slightest heat or fever, or excite a morbid appetite. I should prefer grinding all the corn into homony or meal: it will save about one-third; and is a much safer food—not as liable to produce colic, founder, or fever. One and a half gallons of meal per day is as much as any common sized plough-horse ought to eat. One gallon per day is sufficient for a common sized mule, with hay or fodder, and a small quantity of cut oats. It is much safer to under-feed with grain than to over-feed. And this rule applies as well to the horse of delicate appetite, as the glutton. The horse or mule of delicate appetite, if perchance he gets hungry, and is over-fed, will lose his appetite, and be killed up if kept at work. The glutton, if indulged by over-feeding, will increase his appetite, and will either bloat up with flesh like a whiskey sot, or become a garran, with morbid appetite. In either case is a horse in possession of his powers, a continuance of such a course makes him subject to sudden and violent disease and death. The horse in full possession of his powers, is neither fat nor poor, but at the medium between. If he is fed under what he can well digest, he will decline a little on constant work, but every time he gets rest he will thrive like a pig. As to the quantity of long forage, a greedy horse or mule can, and will, eat too much if given to him. It has long ago been ascertained that a horse with his stomach full of long forage, could not perform in the race or quick draught. It had been ascertained by divers persons, as they supposed, whose letters are to be found in the American Farmer, that rye and wheat straw were unwholesome for mules. In reading an English periodical the whole secret was disclosed to me. That work maintained that long forage should be weighed or measured to a horse, &c., and treated of the injurious effects of too much long forage. When the stomach is too full, the lungs have not room to play: this produces a difficulty of breathing. When the horse, &c. is put to work in this predicament his difficulty of breathing soon produces heat, thirst, sweat, and exhaustion. But this is not all: the lungs become diseased in a very short time by being frequently prevented from receiving fresh air and discharging the old. The mule is much greedier than a horse, and will eat much more long forage of the coarser sort than a horse. Rye and wheat straw have perhaps a stronger fibre, and is slower in digestion than any other long forage. This accounts at once why it is that it is supposed to be unwholesome for mules. Notwithstanding the united statements of the several writers in the *Farmer*, I will venture to assert that both rye and wheat straw will be found wholesome food for a mule or horse, if limited to a reasonable quantity. It is good economy to cut all the long forage for horses, and to feed in the trough without wetting it. Another thing—the horse or mule should not work more than ten hours in twenty-four. He should have as much rest as the day will admit of at noon, consistent with ten hours labor; and while at rest should have every comfort of shade, air, water, feed, and good cleaning. It will be found that ten hours per day in a brisk walk is much more than the quantity of ploughing usually performed. Sixteen miles per day will make four furrows in each row of 4000 corn hills, five feet apart. Those who work an ordinary horse more hours per day, will find the horse in worse condition, and doing less work; and moreover the work is not as good. The plough cuts cleaner, and turns better, and is lighter draught in brisk motion than in slow. Care should be taken that the draught of the plough should never be too heavy for the strength of the horse. A very trifling matter in this respect will do great injury to the horse. It was the last ounce that broke the camel's back. Every planter should breed his own horses and mules. Every person on the plantation then knows all about them. They know what they can eat, and what service they can perform—their good and their bad qualities: and above all, the whole family are attached to them, and are disposed to treat them kindly.

LAWRENCE.

ON THE RUST OF WHEAT, AND OTHER PLANTS.

To the Editor of the Farmers' Register.

Prince Edward C. H. Nov. 1834.

With the enclosed amount to pay my subscription, I transmit to you a few remarks on the rust of wheat, hoping that the reflections thus thrown together may elicit inquiry in relation to the subject, and, at least, give something like a systematic direction to future investigations. It was my design to have addressed you sooner, but various hindrances and interruptions, incident to the life of a professional man, have interfered, and forced me to defer it until now; too late I fear, to allow any one an opportunity, (this season) of employing the means of prevention here suggested.

The rust of wheat and rye, had for many years engaged my attention, as a curious subject in the natural history of the diseases of these valuable articles of agriculture. I have never (from any explanation afforded me, of the nature and direct causes of it,) believed that it was fully understood in what manner rust is formed, even by the most experienced of our agriculturists. In the views which are here expressed, my own observation and reflections have governed, almost exclusively. Rust is to be regarded as a disease; and, like several others, incident to the vegetable kingdom, must be referred to the want of a proper balance between the active circulatory, or supplying, and the secerno-nutritive, or secreting and nourishing organs. Wheat and rye are not its only victims. Tobacco, cotton, corn, and perhaps many other vegetables, are also subject to the same, or a similar affection. According to the views here advocated, a close analogy is to be traced between the

rust and several diseases of animals, more especially as regards the manner of their formation. As far as my observations extend, the established belief that extremes of moisture and warm weather are the most efficient causes, is correct. I think rust could not possibly occur without them; but other circumstances, equally important in the production of it, have generally been overlooked, which I will now consider.

Rust never makes its appearance while the plant is passing through its different progressive stages of developement and growth, nor do we ever meet with it until the wheat has attained to that degree of maturation, in which the whole fructification, as well as every other part of the plant, is incapable of any further enlargement. The doughy state of the pericarp or grain, is the only stage in which wheat can rust. In this state, the slow and regular supply of sap best answers the purposes and demands of the elaborating organs of the fructification. Should the supply now be greatly augmented by the occurrence of warm damp weather, more especially if it exceed the demands of the elaborating organs, it not only disturbs the function of secretion in the spike or head, but continues to accumulate, until the delicate vessels of the culm or straw, immediately below the head, give way by rupture, and it is the sap discharged by these ruptures, drying and encrusting upon the culm, which forms rust. In this condition, as these ruptures never heal, the necessary supplies to the head must be continually intercepted, and being thus in a great degree cut off, the grain shrivels, and either rots, or becomes so imperfect as to be almost useless. Rust is to be observed in small quantities, more or less, every season—but it only deteriorates the crops of wheat, and thus becomes an object of serious attention, when it forms in large quantities. The black spongy formation which frequently takes the place of the ear, in maize or Indian corn, the smut of the oat, the spots in the ripe tobacco leaf, and the rust of the cotton plant, all result from the same cause, (viz.) want of balance between the supplying and secreting organs, and consequent disorganizations from superabundant supplies of sap.

To remedy these evils, the bedding system, (it has occurred to me,) might be found adequate, and eminently useful. The beds should be so formed and graduated as to prevent the too free, and long continued supply of moisture, which will also effectually guard against the dangers resulting from redundancy of sap. Beds might easily be constructed (on land naturally too moist,) in such a manner as to discharge more readily, the superfluous moisture, by draining and evaporation. They should be arranged with spaces between of sufficient width to allow a horse to pass with ease, and whenever the season is very wet, the furrows should be deepened, and the margins of the beds taken off with a dagon plough, or disturbed with a coulter; more especially about the time of the doughy state of the grain. A new and more porous surface about the margins being thus exposed, and the furrows made deeper, the superfluous moisture escapes with greater facility, both by evaporation and draining. This operation may be repeated several times during the doughy stage of the grain, should the season prove very wet. More danger is likely to result to the wheat crop, from excessive than defective moisture. Dry seasons always produce wheat of good quality, which compensates for the deficiency in quantity. Seasons wet and cold, rarely ever induce rust, because the low temperature rather retards the circulation, and prevents an excess of sap. For the same reason, rust is seldom met with in cold countries.

The foregoing is at the disposal of the Editor of the Farmers' Register—and as its author (a medical man) does not profess much experience in husbandry, he prefers to write over the signature of

MEDICO-AGRICULTURIST.

ON LEGISLATION FOR THE BENEFIT OF AGRICULTURE.

To the Editor of the Farmers' Register.

* * * * I trust you will pardon a few remarks and suggestions which shall be thrown out principally in the way of interrogation. I have obtained a "smattering" of information concerning the "Fellenberg School." Would it comport with your designs and inclinations, to lay before the public some more particular account than has hitherto been given with us, of the nature, principles, and objects of that institution? Could not something on the same plan, or with improvements in its modification, be established, with a reasonable prospect of usefulness and success, in Lower Virginia? What is your opinion of agricultural societies and *manual labor schools?* Would it not be expedient to make them the subject, especially the latter, of legislative interposition, and to endeavor, by means of them, to excite in *all our educated youth* a taste for agriculture, and thus unite the advantages of a complete *physical* and *intellectual* education, in those whose talents and influence would be brought to bear with greatest power upon the best interests of the community? For one, I should regard it as ominous of good were *all* our professional men to manifest an earnest solicitude on this subject; I mean *the connection of literature with the pursuits of agriculture.* Would it be consistent with your views of propriety, or with the objects of your Journal, to form, in conjunction with some of your able coadjutors, the resolution to give to the legislature of this commonwealth *no rest* till they shall consent to lend their countenance and patronage to the cause of agriculture? What are our political strifes in relation to the candidates for the presidency, and an hundred other like absorbing themes of petty party animosity and zeal, when compared with *agricultural improvements* in their broad and deep bearing upon the great and fundamental interests of the American people? Trifles "light as air." I have hope from recent events, that Virginia, whose eyes are beginning to be opened, will rapidly advance in shaking off her former disreputable torpor in regard to these things, and that the day is not far distant when she shall be *wide awake*, and perceive with a clear and unclouded vision that *her agriculture and her glory must rise or fall together.*

A LOVER OF HUSBANDRY.

[Our views respecting the necessity for, and importance of legislative aid to agricultural improvement, and the means to be used for that end, concur generally with those intimated by the foregoing queries of our

correspondent: and they have been repeatedly brought forward in former numbers of the Farmers' Register, and will again be advocated whenever the occasion requires it. Perhaps we have said enough—unless the positions which have been assumed in this journal, either are assailed by opposition, or are promised some effective aid from our legislators, or from those who appoint and direct legislators. It will be seen, during the approaching session of the General Assembly, whether any effect has yet been produced. If the *Committee of Agriculture and Manufactures* (which has had a useless existence for some years,) should be properly filled with members who know the proper and important use of such a committee, and have the zeal and ability so to direct its investigations, there might be commenced a reformation of the economical policy of Virginia, which would conduce more to the prosperity of the commonwealth, than all that the legislature has done in the last forty years. If the noble object of promoting the improvement of agriculture was really aimed at by the legislature, the first necessary step would be to ascertain its present state, as affected by political causes—the obstacles to its advancement—and the aids which the law might most readily and effectually bestow to promote its welfare. If the desire was heartily felt by the legislature, it would be all that would be required to lead ultimately to the most beneficial results for the interests of agriculture and of the commonwealth—which, fortunately, are in Virginia identical. Agricultural societies and schools, geological surveys and other means might be used to promote this end—but which do not at this time require more full consideration than has already been given—nor will they, until there is some prospect of such means being brought into operation.]

From the Alabama Intelligencer and Expositor.

IMPROVEMENT OF SOIL BY LEAVES.

If an enquiring mind will go into the woods, where the soil is what we term rich land, and view nature at work, in nature's own way, he will discover readily, that for a considerable depth, this rich soil is a composition of vegetable matter principally, more or less decomposed,—in common language well rotted. He will discover, that what he applies the name of soil to, is composed, almost entirely, of the decayed leaves of the trees with weeds and grass, and rotten wood—perhaps the production of centuries. But on a nice examination of this rich soil, he will be compelled to conclude, from evidence before his senses, incontrovertible, that decayed leaves, form the principal part. If he wishes for conclusive corroborating testimony, he will heap up a mass of them in a pen, sprinkling the mass with lime, and he will find after the process of fermentation, and decomposition has done its office, that the product will, on application to poor soil, produce the finest vegetation, and prove to his senses that it contains the pabulum, or food of plants, in a high degree. By still going on with his experiment, he will find ultimately, that leaves when decomposed, with the aid of decomposing agents, produce an admirable assistant to vegetation, and by forming a mass of leaves, sprinkling the leaves as he forms the mass, with lime, and adding a small portion of rich moist earth amongst the vegetable matter, he will find, on applying it to the earth for the purpose of aiding vegetation, that he has got a pile of manure.

From this evidence before him he will readily conclude, if capable of the operation of common sense, that for the purpose of littering animals, and as an assistant, in forming a compost manure, leaves, especially if gathered while charged with their whole elementary principles, must be an admirable auxiliary, in the production of the dung-stead, and worthy of being most assiduously collected for that purpose.

Amongst weeds, or green vegetable substances, experiment has amply decided, that those which produced the most putrid and nauseous effluvia, during fermentation, were found producing the most active effect, on the growing crop. This fact seems to settle, by positive proof, the correctness of the theory, of many plants feeding rapidly on gases, evolved during the process of fermentation, through the medium of their leaves. As it would be highly desirable, previous to laying down any plan for making manure, in the form of compost, to have some idea of the relative value of different ingredients, which present for that purpose, it may be proper to have some facts placed before us. Leaves piled up in a pen, with alternate thin strata of swamp mud, when partially decomposed are found a superior preparation for the Irish potato crop. Put around the roots of fruit trees, this compost has been found to produce a healthy and vigorous growth. Its operation has been much increased in its efficacy, by the addition of lime to the mass. The finest Irish potatoes that I have seen produced in a southern climate, were produced by the addition of this compost.

A pen was made with small rails, a stratum of leaves, trampled down to twelve inches in depth, a sprinkling of lime added; after sprinkling the leaves well with muddy water three or four inches of swamp mud was then added, and this course continued, until the pen was six feet in height. This compost was made up in the fall, on the first falling of the leaves, and applied to the potato crop in the spring. The effect on the following crop of corn, was all that could be desired. A second pile was constructed with a stratum of leaves, two feet thick, sprinkled well with lime, previously, with muddy water—two carts came up, the one loaded with swamp mud, and the other with dung—from opposite sides the throwing on commenced, at equal pace, so as to mingle the last two well: on the layer of mud, and manure, being completed, say about four inches thick, another layer of leaves was added sprinkled with water from a pond, then lime, mud and manure, and continued, until the pile was about six feet in height —a little earth was thrown on the top. I am satisfied the same volume of dung, spread over the same surface, would not have exceeded in production, either in the potato or corn crop, that followed, and to which the composition was applied, on planting.—In both cases the manure was applied in the drill, but plentifully. The following crop on both grounds was cotton—it was superior—the seed was drilled in the old corn, and potato rows, opened with a Scooter plough. The following year, the seed that came from the cotton, the year previous, was applied to a second corn crop, which much surpassed the first, indeed was amongst the

finest corn crops to be found—wheat and rye followed and were superior.

I give this detail to show that the efficacy of leaves, is decided, in their action on plants, as a manure, when decomposed: for in the crops above stated, they were the basis of the manure that was applied, it being perfectly impossible for all the dung, and lime, that was employed for the formation of the compost, to have produced half the effect, when spread over the soil, or used as the compost was applied.

PLANTER.

From the Gardener's Magazine.

FOUNTAIN WELLS.

The facility in many, and the certainty in all cases, with which fountain wells may be obtained, promises very great advantages. Besides the water of the clouds, rivers, and lakes, it is had from two other sources; viz. land springs and main springs. The first are liable to fail when most wanted, the second never. Land springs are often found upon, and always at no great distance below the surface of the ground. They are collections from exhalations ever rising from the interior of the earth, and from snow, rain, and other condensations of water from the atmosphere. On these last resources, land springs depend for their existence and supply. What is not quickly carried away by rivers, brooks, and drains, sinks into the earth, but being intercepted in its downward course, by horizontally placed strata of rock or clay, reposes thereon, and from there gradually oozes away at the lowest point of the impervious bed which prevented its sinking perpendicularly. Any shaft or opening sunk into this bed readily admits a flow into it from the saturated soil around, which is then easily obtainable by the pump or bucket. Water so procured, always partakes more or less of the predominating qualities of the soil through which it percolates. Hence the different mineral springs; and hence the various degrees of brackishness, commonly called hardness, of domestic wells.

Main springs are sometimes seen gushing out from the sides, but much more frequently from the bases of high hills. Sometimes they are reached by the common well-digger; but in general they are located at a depth far beyond his reach by any ordinary means. The water of main springs is known by its high temperature; this being always more or less, according to the depth from which they flow; those nearest the surface are about 42° Fahr. increasing to 56° or more. They are also known by their quality, being, in almost all cases freer from impregnation of salts, and are consequently called softer water.

Whether the main springs are supplied from the same sources as the land springs, and that they are less impregnated with salts or other qualities in consequence of their receiving greater filtration in their passage to the depths at which they are found, is a question deserving consideration. But that they do possess the qualities of high temperature and purity, is undeniable, and with these qualities water is invaluable. For the kitchen, sideboard, dairy, and still-room, how necessary; in the bath and dressing room how convenient; in the brew-house how suitable; and in the laundry how profitable. To the gardener it is a useful auxiliary, and to the dyer, &c. most important. In short, the art of forming fountain wells, by which may be gained a constant supply of soft water, without labor or expensive machinery, presents extensive benefits, which are not yet even apprehended. At present we are still ignorant how high such fountains may be carried above the surface of the earth, and how copious such jets may prove. The ascent of water from such considerable depths, is in itself a mystery. When the auger is passed down into a subterranean current or reservoir in a valley, and the water flows up, it is accounted for by saying that the outlet is below the principal source. But when such perforations are made on the highest ground, and where there appears no inclination or fall of surface to the spot, it is difficult to account rationally for such a phenomenon. The natural law for water finding its own level, does not apparently apply. Is it the pressure of the atmosphere? the subsidence of the superposited earth? Is it from the expansive power of subterranean heat, or from the temperature of water itself? or what?

From the [Ohio] Farmer's Reporter.

THE ARMY WORM.

Sir—The devastation committed on agricultural labor, by the different tribes of insects, is such as will probably render the study of their natural history an object of importance to the scientific agriculturist, which induces me to send you the following observations on the army worm, for insertion in the Reporter, if you should not be able to supply us with any thing better on the same subject. Not being familiar with the natural history of insects, nor accustomed to write on the subject, I feel diffident in submitting this paper to the public; but I hope, if you should think proper to publish it, it may induce some one better acquainted with the subject, to furnish a more full account of this destructive insect.

It is probable that there are different varieties of insects called army worms, as I recollect having read, before I became a practical farmer, accounts in the newspapers which differed considerably from each other. I first became acquainted with the insect I am about to describe, ten years ago; but so far as my knowledge extends, they were at that time confined to a few acres of ground, joining a farm about a mile from my present residence. This season they have been more extensively diffused, having attacked nearly every farm in several extensive settlements. Being absent on professional business when they were first discovered in our settlement, I did not see them until they were from a quarter to half an inch in length. When I first discovered the worms, they were slightly hairy, but they became perfectly smooth in the latter stage of their existence. There is little doubt that they change their skins several times, though I observed the change only once, on the 23d of May, when, like others of the caterpillar tribe, their voracity increased; and after this period, when feeding, I could hear a noise resembling that produced by the silk-worm in its latter stages. The worm was beautifully striped on the back and sides with red, yellow, white, and black; but the colors became duller as the worm increased in age, and in its last stage it bore a slight resemblance to

the common cutworm, but was brighter, more active and larger, some of them attaining a size equal to the silk-worm. The chrysalis is naked, bright brown, closely resembling that of the cutworm. The moth is dark ash colored, longer than the silk moth, wings horizontal.

In this account I shall simply detail facts as they took place on my own farm, or under my own observation. They were first discovered in our settlement, by their devastations, on the 14th and 15th of May. I first saw them on the 17th on my way home. When about a mile from home, I observed the timothy belonging to one of my neighbors, had become very black, and on riding up to ascertain the cause, I learned that the worms had eaten the roots in such a manner as to cause the tops to die and dry away; and that he had been burning the dead grass with the intention of killing the worms, but in this he was disappointed, as they fell to the ground on the approach of the fire, and the flames passed over and left them uninjured; the ground being literally alive with them after every vestige of vegetation was consumed by the fire. I ought to observe that the whole country was not covered with them in this manner; they were associated in droves or armies of vast size, and between these armies sometimes a considerable space would be entirely clear. I will confine my account of their progress, to my own farm; and in order to make my account intelligible, I must premise that my farm is laid out in the following order: on the north, a field containing wheat and rye, and in the south west corner a little flax; south of this on the east side of the farm, eight acres of oats; on the west side, a corn field; between these two fields is situated the dwelling house, garden and out buildings; south of these fields is situated a field containing timothy, red top and clover, from necessity occupied this season as a pasture for calves, hogs, and geese; from the south field is a lane, to the dwelling, sown with blue grass, red top, and timothy. The worms were at first discovered in the open prairie east of the oat field, afterwards in the south field and grass lane, and lastly in the rye.

I must now endeavor to give you some account of their motions; during the early part of the day they generally lay still, and commenced travelling about two in the afternoon, and continued travelling and feeding from that time through a principal part of the night. On the 23d they commenced moving towards the field of oats, which set me upon the following mode of ditching in order to prevent their inroads, which I believe is the only mode that can be employed on a large scale, with any prospect of success. I commenced by running several furrows with the plough, one within another, so as to make a ditch about a foot deep, and render the earth mellow and dusty; then take a spade or a hoe, and clean out the loose earth from the bottom and lay it on the side which you wish to prevent the worms rising. When they attempt to climb, the loose earth will give way and they will fall to the bottom of the ditch, where large numbers of them will be destroyed by the heat of the sun; and if a few should accidentally cross the first ditch, another must be made parallel to the first, into which they fall. Where the worms are numerous, these ditches must be cleaned every day, otherwise the worms in attempting to climb, will fill the ditches. I had upward of two miles of this kind of ditching, by means whereof I saved a principal part of my oats, and could I have completed my ditching three hours earlier, I have no doubt but I could have saved twelve out of sixteen acres of corn which was destroyed. After the worms commence travelling, if they find sufficient food, they only travel a few steps in the twenty-four hours, but if they find little or nothing to eat, they will travel at least a quarter of a mile in the same length of time. Though large bodies of the worms travel in this manner in pursuit of food, considerable numbers never leave the place where they were produced, but for lack of other food subsist on dry grass and even corn husks.

On the 24th, the worms entered the oat field and destroyed about an acre in twenty-four hours, in defiance of every exertion to stop them by ditching, as a slight shower fell in the evening, which appeared to cause them to travel and feed with greater voracity, and the rain dampening the dust on the sides of the ditches enabled them to cross. On the 25th, still moving west of north, they advanced towards the corn field and entered a lane passing between the oats and corn field, as well as passing along the ditches which I was preparing with all possible expedition along the east fence, occasionally a few crossing the first ditch, which rendered it necessary to make parallel ditches. On the 26th, after cleaning the ditches around the oats, the worms being now on three sides, I succeeded about three in the afternoon, in completing ditches along the south and east side of the corn, and hastened to the north side joining the rye, fearing that by this time they might be able to head the ditch on the east. When I got to the rye I found a younger army of worms travelling south from the rye to the corn; and notwithstanding every effort to stop them by ditching, a sufficient number crossed completely to destroy the sixteen acres of corn before the morning of the 27th. The army of smaller worms appeared to have been produced in the rye field, and meeting with the other army now entering the rye from the south east corner they completely destroyed the wheat to the ground, but only took the blade from the chess and rye. The reason of the worms being most severe upon the wheat arose from the fact of my wheat being of a late variety, having at that time shot out no stems, whilst the rye and chess were in bloom; but some of my neighbors who had early varieties of wheat happily had the case reversed, as the worms destroyed the chess and left the wheat but little injured. Flax was likewise considerably injured, in some places completely destroyed; but what is very remarkable, the worms never interrupted any kind of tree or bush, either timber or fruit tree. Red clover was little or nothing injured, but timothy and red top were cut to the ground, and in many places even the roots were destroyed, but the roots of mine were preserved by the industry of the hogs and geese. The hogs likewise destroyed vast numbers along the fences east of the oats and corn: every kind of poultry eat them greedily, and the birds which are generally so mischievous in our corn fields, have this season been permitted to rear their young in peace, on account of their service in destroying the army worm. But notwithstanding their numerous enemies, they were all satiated without destroying the worms; multitudes

passed in the chrysalis state; the hogs continued to feed upon them until the moths came forth in multitudes. But I am going ahead of my journal.

On the 28th, in cleaning out my ditches, I discovered several of the worms in the pupa state, and on the 1st of June most of the worms had quit eating. Our corn fields are now naked, and we are beginning to think about planting another crop, in hopes that the worms will be gone before the young corn makes its appearance. June 6th, the worms are all gone, and some of our young corn is beginning to make its appearance. June 12th, small gray millers are coming from the chrysalis of the army worm.

Now Mr. Editor, I should be glad if either yourself or any of your correspondents can inform me whether or not these worms have a regular period for their appearance; and if they have whether they usually attack the same places, which had been previously subject to their ravages. If they have a regular period of re-appearance, and that period were once accurately ascertained, much of the mischief they occasion might be prevented, by planting upon places subject to their ravages, only such crops as appear to be in a great measure exempt, whilst places where they are not produced might be protected by ditching. In such seasons the corn crop would be better unplanted until the worms are gone.

June 20th. Since writing the above, I have come to the conclusion that the miller of the army worm is probably migratory, as they all disappeared on the night of the 17th or 18th; and those which were kept in close confinement for the purpose of close observation, have all died without depositing any eggs.

Yours,

JOSEPH BRASHAW.

From the New York Farmer.

DOMESTICATING THE BEAVER.

Mr. Editor—In almost every paper which is issued from the public press, we find something noted as an improvement, which is in some way intended to benefit the community, or to turn to individual advantage. Now, sir, as all animals that are valuable for the fur they yield are becoming scarce, owing to the destructive war that is continually waged against them, it is evident that the value of the fur must be enhanced in proportion to the scarcity of the animal. If, therefore, there can be any method devised to domesticate them, it would be of more importance than almost any new enterprise that could be suggested; and as there have been instances of the beaver becoming as familiar and gentle as a common dog, I can conceive no good reason why that most valuable animal should not be entitled to the fostering care of man as any other animal; and for this purpose I would propose the following method: let there be an enclosure, of from one to five acres, made so as to be secure from dogs or thieves, having a brook passing through it. Plant the enclosure plentifully with that kind of shrub or tree that the beaver uses for food, or for building his habitation. Commence by procuring two or more young beavers of different sizes, which being already familiar with human society, and the enclosure being closely connected with the dwelling house, the animal would never become wild; and as they breed rapidly, the number would soon become very considerable; and if they could not be made to yield their fur without destroying their life, they might be bred in such numbers that they might supply our market with beaver fur as well as it is now with wool from the merino sheep, and make it a much more profitable business, if entered into with spirit by a company. * * * * *

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TAMING THE OTTER.

The Cambridge (Ohio) Times gives an interesting account of the manner in which a Mr. Entz, of that town, has domesticated the wild otter, of the western waters, and made the fur a source of profit by picking it from the body of the animal. Mr. Entz's experience with four otters attests the fact, that each of these animals may be made to realise, according to the present prices of fur, an annual profit of at least fourteen dollars. The otter yields two crops or fleeces of fur a year, which is said to be superior in fineness and gloss to that which is taken from the skin of the dead animal. It is the intention of Mr. Entz to increase his colony of otters, being quite confident he will make the fur trade, thus pursued, a profitable concern. The Times states that it intends on some future occasion, to notice more particularly, some experiments of Mr. Entz in other matters of the same sort. We suppose he alludes to a colony of musk-rats, which we have understood, Mr. Entz has in contemplation.

Several years ago, the editor of the Village Record, (in Penn.) in some remarks on the habits of the beaver, and the perfect feasibility, demonstrated by actual experiment, of taming and domesticating it, suggested a similar plan with regard to that valuable animal, which Mr. Entz has so successfully adopted with the otter.

TOPPING CORN.

[The article containing the interesting experiments of Mr. Clark, which is referred to below, was republished in the 4th number of the Farmers' Register, page 243, but without the author's signature—which was by a mistake of the compositor left out, together with the last paragraph, which was intended to be passed over, because relating to another subject.]

From the [New York] Cultivator.

Experience and science concur in disapprobating the common practice of topping corn. The experiments of Mr. Clark and Mr. Lorrain, which we have published in the Cultivator, go to show that it diminishes the crop; and the principles of science corroborate their report. The corn is nourished by the sap elaborated in the leaves *above* the ears, and when these elaboratic organs are taken away, the supply of food must cease in whole or in part. If fodder is the object, it is far better to cut the whole crop at the ground, when the corn is seared. This mode has two other recommendations: it clears the ground for fall grain, and the corn derives nourishment from the stock after it is cut. We invite our brother farmers, with a view of arriving at a correct result, to do as we intend, that is, to set apart three parcels of corn of similar dimensions, and quality, say three adjoining rows,—to top one part, cut another at the ground, and to

leave the third to ripen with the stalks; and, at the proper time, to husk, measure and weigh the three parcels separately. The results of a dozen such experiments will lead to pretty correct conclusions as to the best method. We not only invite them to make the experiment, but to communicate the results for publication in the Cultivator.

Selected for the Railroad Journal from English Magazines.

PROFITS OF RAILWAYS.

The Stockton and Darlington Railway, which was the first opened in this country for general traffic, has actually multiplied the intercourse between these two towns *forty-fold*.

The shares of the Stockton and Darlington Railway represent £106 paid on each; they are now selling at £299 10s. each. The dividends of the Liverpool and Manchester Railway are limited by Act of Parliament to 10 per cent. (in consequence of the opposition of the great canal interests, against which it had to struggle for existence,) but notwithstanding this the £100 shares are now quoted at £200.

The Liverpool and Manchester Railway conveys now, on an average, about 1,200 passengers daily; which is *triple* the number ever conveyed on the common road during the best days of the coaching system. The quantity of goods transported on this railway has also been constantly on the increase, and falls now little short of 200,000 tons per annum, though it has had to contend in this branch of its business with an unusually strong canal opposition.

That the value of property of every description in the vicinity of railways should have risen amazingly since their establishment, ceases under these circumstances to be matter of surprise. In the course of the evidence adduced before the House of Lords on the London and Birmingham Railway Bill, it was shown that almost immediately after the opening of the Liverpool and Manchester line, the value of the land adjacent to it had risen generally 50 per cent.; and that portions of ground at both extremities, similar to what the Railway Company had purchased for three pence per square yard, could not now be had for less than from three shillings to four shillings per yard, being an advance of full 1,400 per cent.!

From the same evidence it appeared that the Liverpool and Manchester Railway pays on an average one-fifth of the poor rates of all the parishes through which it passes.

Between Stockton and Darlington the charges for carrying goods and passengers have been reduced more than one-half; between Liverpool and Manchester, about one-third.

On the Canterbury and Whitstable Railway —a bad line on a bad plan—the traffic has been increased nearly *eight-fold* within the short period of three years.

The last returns from the Edinburg and Dalkeith Railway exhibit, in one brief year, an increase of nearly 100 per cent. in the number of passengers, and about 30 per cent. in goods. For 1832, the numbers were—passengers, 91,814; goods, 61,000 tons. For 1833—passengers, 160,000; 80,000 tons.

From the Cultivator.

WHEAT AND CLOVER.

The practice has obtained, in Monroe, Orleans, and some of the neighboring counties, the great wheat district of our state, and is rapidly gaining ground, of alternating wheat and clover, that is, of sowing wheat and clover seeds every other year upon the same ground. This is said to afford not only an increase of crop, but to effect a great saving of labor. The clover is sown with the wheat in autumn, or upon it in the spring. It is mown or pastured the second year, and the lay is then turned over, and wheat and clover again sown upon the first furrow. Thus the grounds receive but one ploughing in two years, and the green manure afforded by the clover, is all preserved for the wheat crop, being dissipated by cross ploughings. Thus, too, the clover promotes the pulverization of the soil, keeps it light and friable, and pervious to atmospheric influence, by its gradual decay in the soil. We are advised, upon respectable authority, that under this practice there is seldom a diminution of crops, and that in some cases the product has been nearly doubled in a few years.

The wheat country of the west is a deep secondary formation,—the earth taken from the depth of ten and twenty feet, often exhibiting a fertility when exposed to atmospheric influence, equal to that of the surface soil. It is a deep deposite of vegetable, animal and earthy matter, abounding in the specific food of the wheat crop. Hence it often occurs, particularly in the oak openings, that tillage, by facilitating decomposition, increases fertility even without the aid of manure. But the question worthy of consideration is, whether the practice of alternating wheat and clover, even upon these fertile formations, can be long continued, without impoverishing the soil? A yoke of oxen may be turned to a stack of hay, and they may continue to thrive; but at length the stack and the food will become exhausted, and without a further supply, the oxen will ultimately become poor and die. The vegetable and animal matter in our western soils is to the wheat what the stack is to the oxen, the food which causes growth, maturity and profit, and constant feeding must exhaust alike both. Although the clover lay affords vegetable food, it by no means makes up for the exhaustion of the wheat crop; and we suspect it benefits more by rendering the soil porous, and thus facilitating the decomposition of the vegetable matter which it contains, than by its own enriching qualities. We have little doubt but this alternation would soon fail on ordinary soils; and we believe it cannot be long persevered in at the west without serious detriment. The banks of the Hudson were once celebrated for their wheat crops; and within our recollection, west Vermont sent as fine wheat to the Troy and Lansingburg markets, and it was their staple production too, as now comes from the west. *Now*, west Vermont consumes New York flour, her soil no longer producing good wheat in any quantity. And Oneida, too, is no longer distinguished as a wheat growing country; the specific food of this grain being in a measure exhausted in her soil. We are aware that the preceding cases do not afford exact parallels for the west. They are drawn principally from transition formations, while that

of the west is secondary, and is more permanent in its natural fertility. To assume again our comparison, while nature had supplied one with hay *cocks* merely, she has bountifully furnished the other with hay *stacks;* and the result, we think, will be, that though the latter will hold out longer, they are nevertheless, imperceptibly diminishing, and must ultimately be exhausted, as the former have been, by injudicious cropping. Sterility is the worst disease that can afflict a farmer; and the adage teaches, that "an ounce of prevention is worth a pound of cure." It is far better to keep lands in good heart, by a judicious alternation of crops, than to restore them to fertility when they have become exhausted. Upon this view of the subject, our advice to the western farmers would be, that as soon as his circumstances are comfortable, he should cease to sow wheat upon the same grounds every other year, lest he should kill the goose that lays his golden eggs.

From the New York American.

THE WILD HORSE OF THE PRAIRIES.

In the meantime, those of the Indians who had promised horses in the first day of our meeting now brought them up. A young Indian first came forward, and led up a bright, jet black mare—after him followed another, holding in his hand a long buffalo tug, or halter, which restrained the wild motions of a two year old colt; his color was a snowy white, here and there broken with spots of brown. He had been wild in the prairies but a few weeks before. He was a slave, but had never been mounted; his back had never bent to a burden; they led him up in his own native wildness—his tail stood out—his ears were pricked up—his eyes starting—his nostrils expanded—and every hair of his long mane seemed almost erect with an undefinable terror. At one moment he dashed swiftly around at the full stretch of the long tug which secured him—then pausing and shaking his long mane over his head, he fixed the gaze of his almost bursting eyes upon his captor. Then raising his head, and casting a long, lingering, and almost despairing gaze upon the hills of the prairie, which till then had been his home, he made a desperate leap forward, dragging to the ground the Indian who held the end of his halter; but others rushed to his assistance and held him in. The crowd then attempted to close around him, but he reared upon his hind legs and kept them at bay with the rapid and powerful blows of his fore feet.

At length a young Indian, who was standing near, threw off his robe: he crept cautiously towards the animal from behind, and then with a sudden leap he bounded upon his back, and seized the tug which was secured in his mouth. Before this, the efforts of the animal had been violent; but when he felt the burden upon his back, when he felt the curbing hand of his rider, he sent up a shrill and almost frantic scream; his form bounded in the air like that of the active wild cat; he reared, he plunged, but in vain—his rider was a master hand, and he retained his seat as unmoved as if he had constituted part of the animal itself; he curbed him in, he lashed him with his heavy whip until he crouched like a dog upon the prairies; his spirit was crushed; and the last spark of freedom was extinguished. Shortly after, one of the hunters came up and tied a pack upon his back; he made no resistance; and they led him off with the rest to finish his days in drudgery and toil.

From Silliman's Journal.

POTATOES ON WET LAND.

"In 1796, being in a part of France where potatoes were but little known, and less used, as food for man; and having obtained some Irish seed, I gave them to a country gentleman, at whose castle I was then residing, to plant. He asked me what soil was the most suitable. I informed him that on that subject there were various opinions; but that I had known very good crops, and of good quality, raised on moist ground. He told me that he had one place that was moist enough, being nothing but bog and water; and another dry enough, being nothing but sand or gravel;—and that he was willing to make the sacrifice of these two places for the experiment, since the seed cost him nothing; at the same time saying that he was not partial to Englishmen or potatoes.

"By the side of the morass there was a gravel hill without a sign of vegetable earth in it. The morass was then frozen so as to bear our weight. I proposed to him (or he to me) to use the dry gravel as a mere receptible to hold the potatoes for vegetation. The plan was adopted; many wheelbarrow loads of gravel were placed at proper distances on the bog, and the potatoes planted therein, under my direction. The result was a very early crop of excellent potatoes, farinacious and large; and the same process was continued for years after, occasionally adding a little gravel, when a part of the first deposite had sunk into the morass. The potatoes planted on the dry gravel produced a few plants and bulbs of a very bad quality. Their producing any thing must have been owing to the dampness of the climate, and the copious dews that proceeded from the vicinity of the morass.

"Is it not probable, sir, that in New England where good arable land is not in sufficient quantities for our wants, there are many such morasses, now of no value, which might be made to produce potatoes, and perhaps other useful vegetable food? The experiment seems to be worth trying.

"I will further remark that this aquatic potato patch had no hoeing or other labor bestowed on it, —a matter of some importance where labor is so dear. Again the labor of transporting the heaps of gravel may or must be done in the winter, when the time of the farmer is less valuable."

WILLIAM FOSTER.

From Silliman's Journal.

METHOD OF DESTROYING WORMS AND INSECTS WITH SPIRITS OF TURPENTINE.

By M. D. Thosse.

——I was led to try it by observing that certain plants which have naturally a strong odor, are not infested with insects.

Wishing some years ago to raise four young puppies, I perceived them when a few days old to be very languishing, and discovered that they were full of insects or lice, which were preying upon them. It was in vain that they were comb-

ed—new generations succeeded, or were renewed from the mother, and the little animals were on the point of perishing. I then took into my head to sponge both the mother and the pups with warm water impregnated with spirits of turpentine; and soon found to my agreeable surprise that every turn of the comb brought out numerous dead insects. The little animals soon acquired vigor, and were saved by a single repetition of the process during the course of the summer.

I tried the spirit on various insects. Lice when touched with it on the point of a pin, made a few rotary bounds and fell down dead. Bed bugs anointed with the same fluid, after a few steps, turned on their backs and died. A green gilded insect as large as a bean which attacks pear trees, was touched and died immediately, although another insect of the same kind, lived a long time in warm quick lime.

Butterflies, flies, caterpillars, May bugs, die more or less promptly when attacked with it.

Having learned these facts, I soon found occasion do try its effects on some of my trees, which were attacked by a multitude of worms. These I destroyed entirely by putting into a bowl a few handsful of earth on which I poured a small quantity of the spirits—then adding water, and stirring the whole together until it had a proper consistence to be rubbed or brushed over the ends of the branches. The insects perish with their germs; and the odor remaining several days about the tree, repels fresh invaders. A mixture of earth is necessary, because spirits of turpentine swims upon pure water and will not mix with it; and if used in too great quantities might burn the leaves.

The drought which occurred a few years ago in the canton in which I live, produced a mange in cattle and horses, very extensive and injurious; and those which escaped this infection were filled with lice, from which they were promptly relieved by sponging them with water impregnated with the spirits. This infection caused horses fatigued with labor to rub themselves so much against their mangers and the walls of the stables as to deprive them of much of the rest so necessary to their comfort.

I cannot therefore doubt from the trials that have been made, that much benefit might result from the use of turpentine in clearing fields and trees from insects of different kinds; and that a mixture of ashes with which a portion of this liquid has been incorporated, would remove by its odor, the ticks and other insects which infest turnips. Its odor is more penetrating in the open air than that of sulphur, and some other materials used for this purpose.

ON THE PLEASURES OF AGRICULTURE.

To the Editor of the Farmers' Register.

Independent of the actual profits arising from agricultural pursuits, there is something in the cultivation of the soil, eminently calculated to dispose the philosophic mind to serious and sublime contemplation. With your permission, Mr. Editor, as I have seen no communications of this character in the Register, I shall endeavor to show wherein consist the real delights which the philosophic and man of science derive from agriculture. And I undertake this service the more willingly, from the fact that there are many young men, who from the mere consideration of gain, can never be induced to lay aside their prejudices and become tillers of the soil, but who might be induced to make the experiment, and finally become good farmers, could the subject be presented to them under a pleasing aspect. To those speculative young men who desire amusement as well as profit in their avocations, the present and succeeding numbers I may find leisure to write upon this interesting subject, is respectfully dedicated.

Although the desire of gain is a principal and most necessary inducement to follow the plough, yet all must admit that he who sees no other pleasure in agriculture than that which results from the anticipations of pecuniary profits arising therefrom, is to say the least, a *grovelling and penurious wretch*. There is something really mean and sordid, in overlooking all the beauties of the vernal spring, and the maturing loveliness of autumn, merely to contemplate the amount of *dollars* to be received in return for the daily toil and anxious solicitude of the farmer. Such a disposition reminds one of the folly a man would evince, who should prefer a dark and loathesome cell to the cheerful beams of day, and the pleasing aspect of creation. But to him who looks from nature up to nature's God, and who can recognize the Deity in every expanding, opening flower, and purling rill, agriculture offers charms, calculated to compose the mind, and dispose it to tranquillity and cheerfulness. To such a mind—

> "——— Not a breeze
> Flies o'er the meadow; not a cloud imbibes
> The setting sun's effulgence; not a strain
> From all the tenants of the warbling shade
> Ascends, but whence his bosom can partake
> Fresh pleasure unreproved.———"

Who can look upon a field of wheat, gradually rising in vernal loveliness to the delighted eyes of the contemplative beholder, and mark it in all its different stages, until the ripe grain crowns the hopes of the husbandman with a golden harvest of plenty; and then have the heart to distrust the protection of providence, or doubt the existence of an all-wise intelligence, pervading and governing all things; assigning bounds to the elements, and transcribing the limits of nature? There is not a blade of grass or ear of corn, that does not afford matter of curious and endless speculation to the inquisitive and well cultivated mind. And although upon philosophical principles only, no man can ever understand the process of nature, by which the earth in spring is clothed with verdure, and in the autumn filled with her bountiful productions, gradually maturing for the sustenance and pleasures of man; yet the heart by such inquiries must be ultimately greatly benefited. No man who sees, and contemplates the design and wise contrivance of all the plants and vegetables, that clothe and adorn a well cultivated farm, and reflects upon the inexplicable nature of their existence, fructification, and preservation, under so many adverse circumstances, can have the heart to be a sceptic in regard to our holy religion—because many parts of it are surrounded with mystery. He finds that mystery is inscribed upon the face of all things, and what he cannot understand upon principles of reason, he learns to adore as the production of an infinite and incomprehensible Being. The man of reflection sees much to

admire in the great care which nature manifests for her productions, even in the protection she affords to the grasses which cover our meadows and fields. For not only do they clothe and adorn the fields, but they afford sustenance for all animated existence. The leaves afford food for the cattle, the smaller seeds for birds, and the larger for man: for few readers need be informed that the plants producing our bread corn belong to this class. In those tribes *more generally* considered as *grasses*, I will mention the following as instances, which appear to coincide with the intention of nature concerning them, viz: their extraordinary means and powers of preservation and increase, their hardiness, their almost unconquerable disposition to spread, and their faculties of reviviscence, each of which qualities, considered in detail, would afford interesting matter for a separate communication. In this, therefore, I can only observe the following things in relation to their general properties. They thrive under a treatment by which other plants are entirely destroyed. In proportion to the consumption of the leaves is the increase of the roots. The more the cattle trample them under foot the thicker they grow. Many of the seemingly dry and dead leaves of grasses revive and renew their verdure in the spring. In lofty mountains, where the heat of the summer is not sufficient to ripen seeds, we are told that the grasses are viviparous, and consequently able to propagate themselves without seeds. It is also an observation frequently made that herbiverous animals attach themselves principally to the leaves of grasses, and if left at liberty in the pasture to range and choose, will leave untouched the straws which support the seed. These general properties of vegetables, or properties common to large portions of that kiugdom, are all that the extent of the present communication will allow me to notice, as I am afraid of being deemed too prolix by that class of society for whose benefit I write. But I may here be permitted to ask, whence this admirable contrivance of nature, this adaptedness of the productions of the earth to the peculiar condition in which they are placed, and their perfect subserviency to the uses for which they seem to be designed? Shall we ascribe it to the operations of nature herself? Or looking through nature, shall we discern an ever present and wise Deity, though "invisible or dimly seen in these his lower works," yet superintending and graciously directing all things for the comfort and convenience of his creatures?

In conclusion, I would only observe, that I have just entered the threshold of the ample subject before me. I hope, however, that I have said enough in this communication to impress this general truth, that in the cultivation of the soil there are thousands of objects calculated to expand the mind, increase the understanding, soften the heart, destroy scepticism, and exalt our ideas concerning the Ruler of the Universe. In my next, should the subjects of the present communication come within the design of a journal exclusively agricultural, I will resume the subject more in detail.

W. H. P.

Gillespie's, Buckingham, Oct. 14, 1834.

For the Farmers' Register.

PETITION OF STOCK-OWNERS.

To the General Assembly of Virginia.

The petition of sundry stock-owners, respectfully showeth:

That one of our most precious privileges secured to us in the by-gone time, by some of your wise and just predecessors, is about to be seriously assailed by that all-grasping, pestiferous class of men denominated agriculturists. We mean—what may properly be called the right of common upon every man's land, who does not choose to enclose it with a fence fully five feet high, according to the requisition of our present most equitable law on that subject. This right you will soon be asked to take away; and our present purpose is, to beg of you as our guardians and friends, rather to extend than to abridge it, even in the slightest particular. We pride ourselves on belonging to the very ancient family called "the Goodenoughs"—famous from a period beyond which "the memory of man runneth not to the contrary," for being the staunch, inflexible friends of all old usages,—the irreconcileable enemies of all changes whatever, of a general nature; but especially of such as are comprehended under that new-fangled term—"*internal improvement.*" We therefore deem it entirely needless, in addressing your honorable body, to take the slightest notice of our adversaries' arguments about the prospective advantages to result from repealing the present law of enclosures, or its incompatibility with the rights of property, either real or personal. It is surely quite sufficient for gentlemen of your intelligence and patriotism to be reminded, that *such is the law of the land*—that *our rights* under it are, of course, *prescriptive*—of very long standing too—that their exercise, according to our free and easy fashion, is sanctioned by that well known law-maxim, "*Consuetudo loci est observanda;*" and that "innovations are dangerous things." Why the law which confers the privilege we now enjoy did not go farther, we have always considered a most unaccountable thing, as it might easily have brought us several steps nearer to that admirable state of nature where "might gives right," towards which so many of our public actings and doings of late years have been most happily tending. For instance, as it gives us the right, in all cases, where a fence five feet high does not intervene, to feed and raise as many horses, cattle, sheep and hogs as we please, on other men's land—*a priori* it should also have given us the right to raise ourselves and our children in the same way, since human beings belong to a far nobler race of animals, than any of the quadruped genera. Again, it gives us the right, at any time—nay, at all times, to bear off as much of the produce standing or growing on or in these lands, as we please, be the kinds what they may, provided they be not enclosed with a fence at least five feet high; and provided also, it be borne off in *the bellies* of our stock, instead of being carried on their backs, or in vehicles drawn by themselves, or their owners, which would often be much more desirable. Now, why this over-nice distinction—this very circuitous mode of appropriation? Since the law-makers evidently designed that A might, in the mode specified, transfer to himself, without any equivalent given in exchange, property which once belonged to B C or D E,

would it not have been much better, directly to leave to A himself the choice of the *modus operandi*—in other words, of the particular method of making the transfer? He might sometimes prefer bearing off the produce in his *own belly*, (as in the case of all kinds of fruit,) rather than send his stock to bear it off *in theirs*: or he might choose to convey it away in bags, baskets, or wheel-carriages of some sort or other, either of which he surely should have been at liberty to do, if the privilege that he now enjoys was rightfully secured to him. Again, as we have under the law, this unquestionable right to take (by the agency of our stock as our forage-masters,) not only a part, but the whole of the produce of other men's lands, unless they will be at the expense and labor of protecting it by a fence fully five feet high, why should this right to take what does not belong to us, be thus most inconveniently limited? Why confine it to the immediate produce of land, and to the taking by the mouths and teeth of our stock? If land be really the most valuable species of property, as it is universally admitted to be, why should *that* which is of the greatest value be held by a tenure less secure and exclusive than *that* which is of the lesser value? In other words, why should we enjoy privileges in regard to other men's landed possessions, and not have similar privileges as to their other kinds of property? Why, for instance, should our law compel every land cultivator, who would enjoy the exclusive use of that land, which the law itself so generally calls *his own*, to make a fence around it fully five feet high to prevent other people from using it, and not also compel him to make all his horses, his oxen, his cows, nay, his slaves likewise, of some specified height, to prevent those who own neither from using them also? It would be nothing more than an extension of the same principle which gives us stock-owners the right of raising them on other people's land, and at their expense, whether they consent to it or not. If the latter privilege could justly and equitably be accorded to us, no imaginable reason can be suggested why the former should not also have been granted. It must have been, we presume, what the lawyers call a "*casus omissus*." We therefore pray, that your honorable body, instead of granting the petition of our adversaries, by repealing the present law relative to enclosures, will so alter it as to subject to our use, every land-owner's horse, ass, ox, cow, sheep, hog, or slave, until he will make each of them such a standard height as you may deem most advantageous to us to establish. And we farther pray, that another provision be inserted in the new law, giving us the privilege of bearing off, in whatever mode we please, any part, or the whole of the produce growing on other men's lands, instead of restricting the method to deportation in the bellies of our stock: provided the said produce be not enclosed by a fence of the full height of *six feet*, carpenter's measure, the present standard of five feet having been ascertained by long experience, to be quite too low for some of our most valuable horses and cattle, which, from unavoidable starvation at home, have been driven to the necessity of learning to leap with inconceivable ease, over all such paltry enclosures as do not much exceed the height required by the present law. *This* was passed, as we hope your honorable body will remember, when lands were cheap, plenty, and productive; when our stock were not, as now, driven to their wits' end, to gain an honest livelihood; and when a leap of five feet high over another man's fence, was an achievement of far greater difficulty than one almost of seven feet would now be. Justice, sheer justice, consequently demands, that the law of enclosures, if changed at all, should be so altered as to accommodate itself to the increasing exigencies of stock-owners who have either no land at all, or not enough to support as many cattle as they wish.

All which we respectfully submit to the wisdom and patriotism of your honorable body.

TO MAKE TOMATO CATSUP.

Boil tomatos, full ripe, in their juice, to nearly the consistence of pulp, pass them through a hair sieve, and add salt to the taste. Aromatize it sufficiently with cloves, pepper and nutmegs.—*Cultivator.*

RAILWAY TO CONNECT THE MISSISSIPPI AND CHESAPEAKE.

Report of Col. H. S. Long, United States Topographical Engineer, to Gen. E. P. Gaines, and forwarded by him to the Columbia Rail Road Company, with the accompanying letter.

Amabbena, near Memphis, Ten., Sept. 4th, 1834.

Gentlemen:—I take much pleasure in transmitting for your information a concise report of this date by Col. H. S. Long, of the United States Topographical Engineers, containing a brief exposition of the prominent features of the country recently examined by him, through Middle Tennessee, between Memphis and the *White's creek Gorge* of the Cumberland mountain, near Kingston, East Tennessee—and of the principal difficulties to be encountered in the construction of a rail road in that direction—with a view to its extension to Harper's Ferry on the Potomac, and thence to Baltimore, Md., or Washington city, as well as from some suitable point on said rail road, to Richmond, Va.

The report speaks for itself. Emanating as it does from an experienced head and sound heart, devoted to the true interests and honor of our beloved country, it cannot fail to awaken the latent energies and enterprise of our brethern and neighbors of the hills and dales to be subdued and decorated and enriched by the proposed great work of internal improvement.

It is scarcely necessary for me to add that, I must cordially concur with Col. Long in the views which he has taken of the feasibility, importance and expediency of the proposed work, and the ways and means by which it may be constructed without burdening any citizen of the United States with an oppressive, or even an inconvenient exaction. I am moreover of the opinion that the work might be and ought to be commenced in the ensuing year, as soon as the surveys can be made, and the best possible location ascertained: and that it may be completed within the ensuing five years, without the imposition of a tax of one dollar on any citizen, excepting only the legally authorized *tolls for transportation on the rail road* after its

completion;—provided the government of the United States will favor the work by the proposed loan; or by a liberal donation of wilderness lands such as have hitherto been made for the encouragement of other (and far inferior) works of internal improvement, to be proportioned to their relative extent and importance—mile for mile, or upon a fair estimate of their relative value.

With such a rail road about the middle of August, 1814, our beloved President Madison might by the 24th of that month have availed himself and the nation of the services of 50,000 of our Tennessee, Kentucky and West Virginia sharp shooters; 5000 of whom would have annihilated the British army in its approach to Bladensburg, saved the Capitol and the honor of Washington, and would then have formed the rear guard of this rail road maining veterans in Canada, might have visited Montreal and Quebec in time to have taken, or confined to their own strong holds all the British forces in Lower Canada;—and lives there a man who calls himself an American citizen, who would not willingly raise his voice in favor of the faithful distribution of twenty-five millions of dollars of public money among the industrious and virtuous mechanics and farmers of the isolated villages and towering mountains, for the construction of the proposed rail road, rather than to leave it in the power of an invading foe again to destroy our national archives! or again to dishonor the land of Washington?

I need not pause for a reply, when it is known that this expenditure, in place of its being employed in the construction of fortifications, or in the embellishment of palaces, demanding as they do a constant heavy expense, without any advantage to agriculture or domestic manufactures, or inland commerce, except in a state of war—will contribute in peace and in war to diffuse throughout hundreds hitherto isolated villages and settlements of rich lands, all the benefits without any of the evils of the immediate vicinity of large sea-port towns—benefits which the narrowest minds will comprehend when they see a horse—a single horse—hauling with ease at the rate of 40 miles a day, a load which 40 horses with ten wagons would scarcely be able to move at the rate of 20 miles per day;—or when they see a corps of disposable force—which corps, aided by our few re-*never tiring, mettlesome steam coursers* running at the rate of 30 miles an hour, with a cargo of more wheat, or corn, or meat, or men, than 100 horses can haul, at the rate of three miles an hour!—benefits which in a state of war will contribute to render this nation impregnable—by bringing within the short period of four or five days any and every disposable warrior and supply from all parts of the interior States and districts to the national frontier.

Napoleon, at the head of a French army, triumphed over the best troops of all the nations opposed to him for many years in succession, simply and mainly because he discovered and profited by the great secret of marching six miles further in 24 hours than any other, the best troops of Europe, had usually marched. Hence it was he always attacked his enemy an hour or two before they were quite ready for action. Rail roads and steam power will enable us, so long as we are content to confine ourselves to *defensive war*, to give to the world the first irrefragable evidence—of a Republic the power of a nation—to prove itself to be absolutely impregnable. And this may prove to be the first step taken in christendom towards a millenium, because it presents the only obvious and certain means (a miracle excepted) by which war must be forced to terminate, and no longer to exist.

Having had the satisfaction of a free interchange of views and sentiments with the committee whom you did me the honor through another committee to say would visit Memphis, and who were accompanied by the President and two members from the rail road company at Jackson; the citizens of Memphis generally are pleased with the visit, and they concur with me in the opinion that the interests of each company will be greatly sustained and promoted by occasional meetings and conferences of a similar kind.

The apparent good temper which characterised this meeting could not but be particularly gratifying to those who had long been impressed with a belief that a co-operation and harmonious concert, extending to every point and to every individual interested in our intended great public works, was essential to insure our success.

Embarked as we are in measures of enterprise, which, in a *state and national* point of view, is, in all its vital parts the same—an enterprise in which we know that we can contribute—not indeed to annihilate space and time—but at least to reduce to an unparallelled limit the usual time and expense of moving men and all kinds of movable things—in war and in peace;—an enterprise in which like the officers and seamen and mariners of a ship at sea, we may have in view different kinds of gain or trade, and all may look to ulterior objects of a different character to be attended to whenever the voyage terminates—yet we are alike deeply interested in the safety of the ship, and success of the voyage. Hence we cannot too often or too earnestly admonish ourselves to take for our rule of conduct the *axiom* by which our fathers were borne triumphantly through the war of the Revolution. "United we stand--divided we fall." Our enterprise is one which without the hearty co-operation of each other, we cannot for many years to come accomplish. We must act in a manner calculated to inspire the confidence of our neighbors, and for this purpose we must be faithful to ourselves and to each other. If they find us to be consistent—if they find our plans to be the result of mature deliberation and prudent circumspection—and moreover, if they find our measures of execution judicious, and marked with strict economy, industry and perseverance, we shall inspire the confidence of all who see and know us, and they will help us—and we shall triumph over all difficulties;—but, if on the contrary, they find us cut up into opposing factions, filled with a spirit of rivalry, or local prejudices, or sectional antipathies—endeavoring to counteract or cripple each other—or making weight to throw into the scale of some political favorite or demagogue, we shall in this case fail to accomplish any thing worthy of ourselves or our country—we shall be abandoned, and we shall deserve to be abandoned by the virtuous and the wise of our own and our neighboring States. My deliberate opinion as often hitherto expressed, and my constant rule of conduct has been and will continue to be in accordance with the foregoing views.

I am gratified to have it in my power to inform you that our subscription books embrace a very substantial list of subscribers to the amount of considerably upwards of 300,000 dollars.*

EDMUND P. GAINES.

REPORT &C.

Sir:—In obedience to your instructions of 2d ult., I have examined the country between this place and the easterly base of the Cumberland mountain, in East Tennessee, with the view of ascertaining as nearly as practicable from personal observation, the feasibility of a rail road in that direction. The time and means at my command and applicable to this service, were far too limited to admit of an examination so minute and multifarious as the great extent and diversified aspect of the country would seem to demand, yet the results that have been attained are even more favorable than could reasonably have been anticipated, though less satisfactory and conclusive than those in which a more protracted and costly examination might have led.

I now submit in conformity to your request, a brief exposition of some of the more prominent features of the country examined, and of the principal difficulties to be encountered in the construction of the contemplated rail road, leaving such details as I have been able to collect in reference to the subject, to be embodied in my general report on the several examinations in which I have been engaged.

The route under consideration is to be regarded as a portion of a grand route, extending from the head of Chesapeake Bay to the Mississippi river, and may be designated with propriety by the name of the Chesapeake and Mississippi Rail Road, connecting the largest bay within the United States with the largest river in the world. The entire length of the route will be nearly 1000 miles. On a portion of it a rail road has already been constructed by the Baltimore and Ohio Rail Road Company, viz: from Baltimore to the Potomac river, about 70 miles. On another portion, viz: from Harper's Ferry to Winchester, Va., a rail road is in the progress of construction—surveys have moreover been extended through the great valley of Virginia to the Tennessee line, near Bluntsville, and a rail road has been pronounced practicable on this portion of the grand route. A personal acquaintance with the valley of Tennessee from the Virginia line to the Easterly base of the Cumberland mountain, convinces me that a rail road is equally practicable on this portion of the route, which will terminate in the valley of the Clinch river, near the confluence of Emery's river with that stream. The valley region just alluded to, viz: the valleys of Virginia and Tennessee, present no uniform, continuous or direct valley route, but a succession of valleys or glades, intervening between the numerous insulated hills, and ridges of greater or less magnitude, with which these valley regions are studded, and amongst which, although I have never examined the country with a view to the choice of a route for a rail road, yet I feel persuaded from a general knowledge of its aspect, that a route favorable for a continuous rail road, leading from the mouth of Emery's river, on Clinch to Harper's Ferry on the Potomac may be found, and shall presume on its practicability till the reverse shall have been established by actual survey. The principal difficulties to be encountered on such a route will probably consist in numerous deep cuttings and perhaps occasional tunnels, in passing from one valley or glade to another, and occasional plains inclining at an angle of about one degree in crossing the principal ridges. I have been informed that a route nearly direct leading from the valley of the Roanoke to the summit of the Allegany mountain has been surveyed by Capt. Crozet with an uniform ascent of one degree, or 92 feet per mile.

Ascents of the character just mentioned are contemplated to be overcome by the aid of teams of horses or mules stationed at the foot of the plain, and kept in readiness to aid the locomotive engine in conveying its load upward, to the summit of the plain. On arriving at the head of the plain the team may be detached from the train and placed in stable cars fitted for that purpose, in which they may descend to the foot of the plain and be in readiness to ascend with the next train.

With respect to the route from Memphis on the Mississippi, to the easterly base of the Cumberland mountain, my late examinations and the information I have been able to obtain from persons well acquainted with the aspect of the country traversed by different portions of the route, are more definite and conclusive, and I now take occasion to present a summary of the results to which they have led, and which are as follows, viz:

Commencing at Memphis, the route proceeds in a North Easterly direction to a point near Jackson, the distance being 85 miles. This portion of the route has been surveyed by Mr. J. Thompson, and has been found practicable at a gradation of 30 feet per mile without incurring excavations or embankments on any part of it more than 20 feet deep, while by far the greatest proportion of the route is on level ground. Extensive causeways will be required in order to pass the valleys of Wolfe, Big Hatchee and Forked Deer rivers and their branches.

From Jackson the route proceeds Easterly, pursuing the valley of the middle fork of Forked Deer river to its head, there crossing a low ridge, by means of cutting about 20 or 25 feet deep for a short distance and thence descending through the valley of Beech river to the Tennessee river. This portion of the route embraces a distance of about 51 miles, is remarkably direct and passes over bottom land, for the most part secure from inundation, and affording a very easy graduation both with respect to inclination and road formation.

The Tennessee river must be crossed by a bridge or viaduct 350 yards long, with causeways of considerable extent leading across the bottoms on either side of the river.

From Tennessee river to the valley of Bigby creek two routes are presented, of the following characters.—*First*, a route leading upwards in the valley of Cedar creek, to its head in Buffaloe ridge, which is about 200 feet high, passing through the ridge by means of a tunnel 700 yards long, thence crossing Buffaloe river, and pursuing the valley of Sinking creek to its head, thence descending by a ravine, crossing Trace creek on a

*[The numerous errors in the foregoing letter are in the newspaper copy from which this is taken. Ed. Far. Reg.]

high bridge and causeway and ascending in another ravine to its head, thence descending in a ravine, crossing Little Rock-house creek on a high bridge and causeway, and ascending in a ravine to the surface of a tabular plain called the Barrens—thence along the Barrens, on ground nearly level, to the head of a considerable branch on Bigby creek, and thence down the ravine of the branch, to the valley of Bigby creek—cuttings of considerable depth will be required at the ridges crossed by this route: and in order to surmount the ridges, plains inclined at an angle of about one degree, on which as before remarked, horses or mules may be employed, may be necessary appendages.—*Second*, a route leading from the Tennessee upward, either in the valley of Cypress or of Brush creek as far as it can pass at an inclination of 36 feet per mile; thence ascending Buffaloe ridge by means of an inclined plain for stationary power—thence crossing the crest of the ridge by a cut of 40 or 50, perhaps 60 feet deep; thence crossing a depression, the depth and width of which are not known, which serves as a channel for part of Buffaloe river when swollen with a flood, and which must be crossed by a bridge of greater or less height and extent; and thence along the Barrens, on grounds dividing between the sources of Sinking, Trace, Little Rock-house, Grinders, and Pond creeks on the south, all of which fall into Buffaloe river and various tributaries of Duck river on the north. The route will of course be serpentine in its passage along the dividing grounds above considered, but it is believed that it will be found nearly or quite level. Having pursued the dividing ridge as above, the route may descend into the valley of Bigby creek by the ravine of one of its branches, and at a declivity not exceeding one degree.

On this route the crossing of Buffaloe river will be greatly facilitated by means of a natural bridge or causeway, beneath which is a subterranean channel large enough to admit the free passage of the entire river when not swollen by freshets.

My belief in the practicability of this route, is grounded upon information given me by a gentleman who has travelled over most of the ground, and whose statements and opinions are entitled to full confidence.

The distance from the Tennessee river to the valley of Bigby creek by either of the routes above considered, may be estimated at 50 miles.

From the point at which we enter Bigby valley, the route leads through a valley country in which Mount Pleasant and Columbia are situated, and which is characterised in a remarkable manner, not only for the richness of its soil, but from the multiplicity of insulated hills and ridges with which it abounds, and between which are to be found easy passes for a rail road, at the expense of moderate cuttings in the higher parts of the valleys, and slight fillings in those portions that are less elevated. On leaving this beautifully variegated tract, the route proceeds upward in the valley of Duck river, passing through a succession of extensive glades, many of which are clad in a dense growth of red cedar of superior quality. The route will probably cross Duck river several miles below Shelbyville, and lead through a large tract of level country denominated the Flat-woods, and pass thence over ground somewhat broken, for a few miles, to the valley of the Garrison Fork of Duck river, near the confluence of M'Bride's and Noah's creeks. The grade on this portion of the road may be effected at a rate no where exceeding 36 feet per mile, at a moderate expense of excavations and embankments.

The distance embraced by this portion of the route, viz: from the entrance into Bigby valley to the junction of M'Bride's and Noah's Forks or creeks, is estimated at 68 miles.

From the point just mentioned, the route proceeds upward in the valley of Noah's Fork, about eight miles at a grade not exceeding 36 feet per mile, and then in a distance of about two miles, rises to the surface level of the Barrens, upon which it tends eastwardly upon favorable ground to Charles' creek, and thence downward on ground quite as favorable, either in the valley of Charles' creek, or on one of the ridges adjacent to it, to Collins' river which it must cross on a bridge 50 or 60 feet high, and about 120 yards long, besides the causeways on either side of the river connecting the bridge with the high lands. From Collins' river the route continues its eastern course on ground less favorable, for the distance of about 10 miles, crossing Rocky river by means of a bridge about 100 feet high and 200 yards long, which will be necessary in order to maintain an elevation adapted to the general level of the neighboring country.

The distance on this portion of the route is estimated at 43 miles, which carries us to the point at which we begin the ascent of Cumberland mountain. The road may be graduated at a rate no where exceeding 36 feet per mile, except at the horse plain leading from the valley of Noah's creek to the summit of the Barrens, which as before remarked will have an inclination of about one degree.

The last and most difficult portion of the route examined is the passage of the Cumberland mountain, the ascent of which, on the west side, must be effected by means of two inclined plains, with stationary power, and the descent on the east side, by means of a plain descending at the rate of 40 to 60 feet per mile, the operation upon which may be similar to that upon the Sutton and Rain Hill plains of the Liverpool and Manchester Rail Road. To these difficulties may be added perhaps, that of a horse plain, at an inclination of about one degree, for a distance of about three miles on each side of the summit ridge of the mountain. With these exceptions the route may be graded across the mountain at a rate not exceeding 36 feet per mile, at the expense of cuttings and fillings of considerable depth, at a few places, and occasional high bridges of moderate length, in four or five instances.

The leading features of the route across the Cumberland mountain are briefly as follows:—An inclined plain with a lift of about 150 feet, and an inclination of about four degrees; then a level of about three fourths of a mile, on a bench of the mountain; an inclined plain rising about 400 feet, at an angle of five degrees. This plain as well as that above mentioned, will be straight, and may have its stationary power located midway of the plain, where water may be had to supply a steam engine. From the head of this plain the route will pass on favorable ground for a distance of four miles, where it must cross the Dry Fork of Cainy creek on a high bridge. The route proceeds thence past the sources of Fall and Piney creeks

tributary to the same, about 10 miles, on variable ground requiring much excavation and embankment in places, and then crosses Cainy creek, which requires a bridge about 60 feet high, and 250 or 300 yards long. The ground continues rather unfavorable for a distance of about 2½ miles further, when we enter upon extensive glades with a slight undulating surface, over which the route passes for a distance of about 12 miles. We next ascend to the Bee creek summit by a horse plain, rising at an angle of about one degree, in a distance of three miles, where we reach the highest part of the mountain traversed by the route. From this summit we descend about two miles, at a similar inclination, and then pursue a North easterly course, descending at the rate of 40 to 60 feet per mile, till the route crosses Daddy's creek, which must be done by means of a bridge 50 or 60 feet high, and perhaps 300 yards long. The route proceeds thence on a level, or nearly so, three miles, to the head of Crab-orchard creek, and thence down the ravine of Crab-orchard, Piney and White's creeks, by a meandering course, and descending at the rate of 40 to 60 feet per mile, for a distance of eight miles where it leaves the mountain and enters the Tennessee valley; at a point 10 miles distant from the Post-oak spring, or by estimation, 18 miles from the mouth of Emery's river, between which, and the point at which the route reaches the easterly base of the mountain, there is a continuous valley route.

The ravine through which it is proposed to carry the rail road from Crab-orchard to the base of the mountain, is narrow, rugged and rocky, but according to the best information we could get from persons who have explored it, the valley is generally free from short curvatures, and of nearly an uniform declivity. The road formation on this part of the route will of course be expensive.

The distance by the route from the westerly to the easterly base of the mountain is estimated at sixty miles.

Hence the entire distance on the proposed route from Memphis to the Easterly base of the Cumberland mountain, is 358 miles.

It is to be presumed that the route above designated has the best approximate locality, in every part: on the contrary minute examinations which it was not in our power to make, may show the propriety of very considerable deviation; it is nevertheless confidently believed, that no general route can be found, leading in the same direction, and traversing this exceedingly diversified, irregular and broken portion of the country, that can have any fair claim to a competition with the route described.

In the selection of a route no regard has been paid to sectional interests or local accommodations. There is not a single town or village in the whole line likely to be invaded. The only considerations that have governed the choice, are shortness of route, cheapness of construction, and facility of transportation.

In connexion with the above route, numerous branches leading to important points are deemed practicable: among the most important, probably is a branch, connecting with the main road in the Barrens, near the head of Charles' creek, descending about 500 feet into the valley of Stone's river by one or more inclined plains, and proceeding thence along the valley of Stone's river, which is remarkably favorable for a rail road, to a point near Nashville, and thence by the most favorable route to some point on the Ohio river suitable for its termination.

Other branches of less extent may lead from the main stem, to the several towns and villages situated in the neighborhood of the route—for examples, to Sommerville, Bolivar, Brownsville, Jackson, Lexington, &c. in West Tennessee—to Mount Pleasant, Columbia, Farmington, Murfreesborough Shelbyville, M'Minnville, &c. &c. in middle Tennessee—and to such other points as may be deemed advisable.

The main route extended to the line dividing between the States of Tennessee and Virginia, embraces an additional distance of 152 miles further, making the entire route within the State of Tennessee 510 in length.

The distance on the route from the Virginia line to Harper's Ferry on the Potomac, is estimated at 394 miles, making the entire distance from Memphis to Harper's Ferry 900 miles.

The distance from Harper's Ferry to Baltimore, on the Chesapeake Bay, is about 85 miles, making the length of the entire grand route from the Mississippi to the Chesapeake Bay, 985 miles.

The range of the Alleghany mountains, which is pervaded almost throughout its whole extent by this extensive route, has been very appropriately denominated the Back-bone of the United States. The contemplated rail road may with equal propriety be denominated its spinal marrow, alike essential to the protracted vitality of our confederacy, and to the healthful condition of its several members.

The cost of such a work will no doubt be very great; amounting to between 20 and 30 millions of dollars.—But it is believed that the means of its accomplishment may be obtained without serious inconvenience, either to the community or to individuals; and I here take leave especially to suggest the manner of procuring them.

The United States now pay annually for the transportation of a daily mail weighing less than half a ton, one hundred and twenty-five dollars per mile, the daily distance being only 70 miles.

This annual expenditure regarded as interest at four per centum, the rate at which government loans may be effected, answer to a capital of $3125 for each mile, or $3,078,125, for a distance of 985 miles, the computed length of the contemplated rail road.

For the transportation of a mail the weight of which does not exceed half a ton through a daily distance of 200 miles or nearly three times the present daily distance, the United States can afford to pay double the price above stated, viz: $250 per mile annually, which is equivalent to an interest of four per cent., on a capital of $6250.—This sum for each mile on the entire distance from Baltimore to Memphis, 985 miles, will give for the aggregate amount $6,156,250.

Let the companies organized and associated for the construction of the road borrow this amount from the general government, giving proper security for the payment of interest thereon, till such time as the road shall have been completed; and for the subsequent transportation of a daily mail of the weight and through the distance last mentioned:—and in addition to this amount, let the associ-

ated companies also borrow of the general government $3,843,750 more at the same rate of interest till the completion of the work, obligating themselves to cancel this debt by transporting for the U. States, at the ordinary rates established for the road, troops, arms, and other military stores, Indian supplies, &c. on any portion of the road through which such transportation may be required.

The sums thus obtained of the United States will amount to	$10,000,000
Probable amount of subscription on the part of the State of Virginia	3,000,000
Do. do. on the part of the State of Tennessee	3,000,000
Do. do. on the part of the Baltimore and Ohio Rail Road Company	2,000,000
Do. do. on the part of individuals in the State of Virginia	2,000,000
Do. do. on the part of individuals in the State of Tennessee	2,000,000
Do. do. on the part of individuals in other parts of the United States	3,000,000
	$25,000,000

viz: twenty-five millions of dollars, which is believed to be sufficient for the construction of a double rail road, of the most approved, substantial, efficient and permanent character.

As a means of reimbursement for the heavy expenditure, in addition to the transportation of the United States mail, we may safely count on the daily transportation of at least 15 passengers in each direction, and on the conveyance of freight to the amount of 150,000 tons annually in each direction.

In conclusion, I beg leave to signify my acknowledgement of the kind attention and assistance rendered by gentlemen of the Jackson and Mississippi Rail Road Company, and to the Columbia Rail Road Company, and particularly of the personal aid bestowed by Gen. Brown and George G. Skipwith, Esq.,—the latter of whom accompanied me through the entire route.

I have the honor to be, sir,

Very respectfully,

Your obedient servant,

H. S. LONG,

Top. Eng. Ct. Lt. Col.

BROOM-CORN.

From the New Hampshire Gazette.

There has been a stir among the broom-manufacturers and others within a few days, and large quantities of the growing broom-brush in Hadley, Hatfield, and other river towns, have been purchased at seven cents per pound, which is an advance of one cent or more from the prices given last year. Some uninformed of the rise, have sold at five and a half or six cents, and many are holding on, intending to get more than seven cents. The crops of broom-corn in New Jersey and Ohio are said to be good, and some persons do not see any sufficient cause for the present advance; but we conclude that the Shakers and other purchasers know what they are doing.

FRENCH AGRICULTURAL PUBLICATIONS.

We have just now succeeded in obtaining the first supply of periodical publications on agriculture from Paris, after ineffectual efforts for more than a year: and after much trouble incurred, and with much expense, compared to the object, it is believed that the arrangements now made will henceforth keep us regularly and speedily supplied with some of the latest French periodicals, and enable us to present to our readers whatever articles they may furnish worthy of notice, either for their intrinsic value, or merely for their novelty. Our supply of British periodicals is more directly obtained, and with very little delay, by the line of James River and Liverpool packets. The work which we formerly obtained from Belgium, (the *Journal d'Agriculture des Pays Bas,*) has ceased to be published, in consequence of the disorders of trade, caused by what our Belgian correspondent calls their "stupid revolution."

AGRICULTURAL REVIEW.

Société Royale et Centrale d'Agriculture.

The proceedings of the principal agricultural society of France, judging from the smmmary reports of the sittings now before us, and the memoirs selected for publication, appear to be of less interest and value, than might be expected from such a body. The course of procedure, however, is different from what has been the general, if not universal practice of agricultural societies in this country; and ours may learn something useful from the exhibition of that course, even though the subjects treated of should be unimportant. It is for this reason principally that the following translations of extracts are presented; though they are not altogether devoid of interest in other respects. Several subjects which were under consideration at some of the sittings of the society, and which deserve a distinct notice, will be presented hereafter in a separate form. Among these, there is a minute report of the remarkable and rapid variations in the height of water in an Artesian Well at Rochelle—and a discussion of some length on the effects of artificial meadows, and grass culture on the product and quality of succeeding grain crops. These, with various other matters we shall pass by, and present only short extracts on various subjects, which will best serve to show the general course of procedure.

The meetings of this society are frequent, and the business is not confined (as with us) merely to hearing communications read, (or more frequently having none to read,) but it also includes discussions, or rather, free conversations on any subject suggested by written communications, or by other proceedings of the society. The facts and opinions thus verbally and freely presented by members, are recorded by the secretary in a "summary of the sitting," and published. It will be readily perceived that this plan must make the meetings far more interesting, and consequently better attended, and the results of the labors of the society

more profitable. This is particularly worth the consideration of the members of our newly formed agricultural societies—which if constituted and operating as has been the case heretofore, will find their greatest difficulty to be, that when they meet, there is nothing presented for them to hear, or to discuss. We are a *talking* rather than a *writing* people. On the French plan of procedure, there would be no lack of assistants, nor of facts and opinions which they would present in conversation: and these conversations would lead to written memoirs from individual members, and reports of committees on the various subjects introduced, which would furnish plenty of business of a more deliberate and solid kind. We proceed to the extracts, taken from the *Annales d'Agriculture Francaise.*

Summary of the sitting of December 4, 1833.

"The President of the Agricultural Society of Lyons presents a copy of the work of *Butret* upon the pruning of fruit trees, of the edition published by the society of Lyons. He announces that he has made some experiments upon the method of planting twigs, or cuttings, of fruit trees, inserted in the roots of potatoes. His trials have all been fruitless: the cuttings have perished. In some cases the potatoes have rotted, in others they have sprouted. A member of the society observes, that the roots of the potatoes were only dug into to receive the ends of the cuttings, and that perhaps they ought to have been pierced through from one side to the other, in order that the radicles which would be developed around the cutting, might be able immediately to find soil; which is perhaps the reason of the failures—the result being opposed to those of other experiments."

"M. Huzard made a verbal report upon a little printed work of Sir John Sinclair's, upon the Roman Malaria. He concludes that the translation of this work may be useful, on account of the general views which it contains upon the bringing into cultivation marshy and unhealthy lands. The society sends the work to the editors of the *Annales d'Agriculture.*"

The work of Sir John Sinclair's referred to, is that which was published in the first volume of the Farmers' Register.

December 18*th*, 1833.—"M. Chabrol de Volvie states that he was present at the trial of the *mechanical tumbril*, (machine for removing earth,) of M. Paulin Palissard (the son.) The machine appeared to him to fulfil the intention of the inventor; but that it is rather too complicated. The common *ravale* without wheels, which is employed by our cultivators to level their land, to dig ditches for conveying water, and which he had seen used in Egypt, appeared to him more suitable to the wants of agriculture. Perhaps the instrument of M. Pallissard will be preferable and economical in the great public works of bridges and roads."

The *ravale* referred to seems to be similar to the *mouldebaert* of Flanders, or the scraper of this country, which is made much use of in the Northern States, but is scarcely known, and seldom used, in the South. In a subsequent number of the *Annales* a plate and description of M. Palissard's trumbril are given. It is a scraper with wheels.

The next extracts are specimens of the manner in which the elections of corresponding members are announced. The claims to the honor are seldom so strong as these—but in every case, there is attached to the name, some circumstances relating to the condition of the member elect, which may be supposed to furnish the ground for his being chosen.

January 8*th*, 1834.—"The society proceeded to examine the titles of canditates proposed in the sittings of preceding years to be named as correspondents of the society, conformably to the ordinance of the King, which has authorised the society to increase the number to three hundred.

Correspondents appointed—

For the Department of the North. M. Alexandre Coget, member of the Chamber of Deputies, cultivator of his own land in the *arrondissement* of Lille, and who belongs to a family which, for three generations, has been distinguished for having fine orchards and plantations.

——— M. Debuyser, proprietor, director for the last twenty-five years of the French *moeres*, vast marshes which he has taken from the dominion of the waters, to convert them to fields and fertile meadows.

For Mayeme. M. Léon Leclerc, proprietor and extensive planter, [of trees] who possesses the most complete collection of fruit trees which exists in France."

January 22*nd*, 1834.—"Memoirs and notices addressed to the society—from M. Bacon, on the duration of leaves in Normandy—from M. Piérard upon plantations (of trees) on bad and shallow soils—and from M. Marcellin Vétillart, relative to grafts upon roots. All received to be read.

M. Payen announces that M. Champerois has discovered the means of condensing, by a very simple apparatus, the gases which escape from the carbonization of bones; that this condensation is made in very mellow earth, which, without the least doubt, must become by this operation a very good manure."

February 5*th*, 1834.—"M. de Galbois, in a letter, announces that the black pyritous ashes prepared in this department, are more and more in demand for manure, in that of the North—and that the consumption of the last year has exceeded 200,000 hectolitres. This substance, taken on the ground, may be delivered at the rate of 50 centimes the hectolitre, weighing about 200 lbs. Afterwards, M. de Galbois gives an account of the labor expended on the Artesian Well of Montreuil-sous-Laon, which has already descended 816 feet below the soil, of which 770 are in a bed of chalk, without yet reaching water to burst up: nevertheless the boring is continued."

The manure here referred to must be of a kind similar to the *cendres de mer*, or Dutch ashes, the value and effects of which have been described at large in several preceding numbers of the Farmers' Register.

February 19*th*, 1834.—"M. le Compte de Montlosier addresses to the society a memoir relative to the scarcity of manure [barn-yard] in France, and the means for remedy of the evil. Ordered to be printed.

M. Soulange Bodin communicates new documents upon the extension of the cultivation of the *Morus Multicaulis* [or Chinese mulberry.] It appears from a notice printed at Boston, and of which M. Soulonge placed a copy on the table, that this tree is actually employed for the feeding of silkworms, both in the neighborhood of that city and of New York, where it has resisted the most rigorous cold of the winters. Near Venice there have been made experiments and observations preserved in a memoir addressed by M. Maupoil, who cultivates it largely on the Brenta. There have been obtained from sowing the seed, by this cultivator, a great number of varieties, which appear generally to approach to the white mulberry; which tends to prove that the first [the Chinese] is not a distinct species, but, as a valuable variety, cannot be preserved except by multiplying it by cuttings, grafts, or layers. It appears indeed that it is exclusively by

cuttings that the Chinese cultivators have propagated this tree, from time immemorial."

February 26th, 1834.—"A note was read from M. de Fayolle, in which this correspondent announces to the society, that a priest of the Department, M. Paramelle, seems to have discovered the passages that subterraneous waters follow in their course. The author of this discovery has already made numerous applications of it, in that Department and in that of *la Dordogne*, and at M. de Fayolle's also, in seeking for, and pointing out, springs which have almost always burst forth from the depths which he had previously indicated. After some observations made by M. Héricart de Thury, the society suspends its judgement on the extraordinary facts reported in this note, until M. Paramelle has published the work which he announces on this subject, and in which he will explain his hydrognostic theory. In the mean while thanks will be returned, in the name of the society, to M. de Fayolle for his communication."

March 7th, 1834.—"A letter was read from M. Villeret on the agricultural operations at Algiers, in which he announces the success of many articles of culture, among others of cotton and of the coffee plant, sugar-cane, &c. &c., and the probability of the success of many others. M. Mirbel announces that M. Amanton cultivates cotton with the greatest success in the Government garden at Algiers, and that there is no doubt of the possibility of a profitable culture of this plant. He announces that the coffee plant grows well also, with all the cares which are lavished on this shrub; but that much doubt exists relative to the profits of its cultivation. As to the sugar-cane, it grows well; but will it yield as much sugar at Algiers as in the countries where it is now profitably cultivated, and will not the very high price of labor at Algiers increase the chances of no returns from this culture? Every thing, at present, seems to indicate that the efforts of agriculturists ought not to be directed to the cultivation of the sugar-cane.

M. Chevreul reminds, that Proust has said, from experiments made by this chemist, that sugar-canes harvested in Spain, do not yield enough sugar capable of crystallization to make it profitable to extract and crystallize this sugar.

M. de Lasteyrie thinks, from data of his own, that the climate of Algiers is sufficiently warm to ripen the cane as well as in the Antilles and in India, and to make it produce the same quantity of sugar and of as good quality.

M. Mirbel replies that the coast of Algiers is not warmer than the southern coasts of Spain, and that he sees no probability that the cane can there acquire superior qualities. And if it could even acquire superior qualities, it is not probable that it can acquire the qualities of the canes of the Antilles and of India; besides, the high price of labor would form a second obstacle to the economy of its cultivation and manufacture: he does not therefore think it prudent yet to indicate the sugar-cane as likely to yield profitable products at Algiers.

M. Girard says, that he has seen sugar-cane cultivated in Egypt, that it yields, it is true, a sugar capable of crystallization, and this sugar is extracted without being refined. But he believes the climate of Egypt more favorable to this culture than that of Algiers, and yet the cane cannot be cultivated there with near the same profit as in the Antilles.

M. Michaux, without deciding on the question, says that he has seen cultivated in the southern provinces of the United States two very distinct varieties of the sugar-cane: one which ripened in five months, while the other required eight before being fit to cut. The first was cultivated with some profit in provinces where it freezes in the winter. Perhaps we might try this species in our African possession.

M. Warden communicates a letter of a Mr. Treeman of South Carolina in the United States, in which he mentions a new variety of herbaceous cotton, of long staple, obtained by him, and very superior to that now cultivated. He has sent with his letter some samples of the cotton still in the seed. M. Warden submits the samples to the inspection of the society."

We are at a loss to know what kind of cotton is here spoken of, and who the person is from whom it was derived. But as foreign names of persons are rarely placed in a French work without being changed in the spelling, it may be doubted whether Mr. Treeman's name as here given, without the circumstances which accompany it, would be recognized by its owner. But besides this, there are several other parts of these extracts which show that facts, which in this country are so well known that no one would think them worth being made subjects of distinct communication, are both new and valuable in France—and in like manner, the farmers of this country may receive profitable instruction from the incidental remarks of foreign writers, on subjects which they would have deemed every where of trivial, if indeed of any value. It is very true that the great mass of agricultural practice in either country is unsuited to the other. But still there are many exceptions to this general state of things—and in these alone, either country may greatly profit from details of the agriculture of the other. An open and free exchange of information is greatly wanting, and it is hoped that this desirable state of things is not far distant. We are approaching to the possession of free trade—and of all commodities which it is desirable should be exchanged freely, *knowledge* is the most important, and the most profitable to both parties.

Translated for the Farmers' Register, from the *Bulletin de la Societe d'Encouragement pour l'Industrie Nationale*—1834.

DIRECTIONS FOR THE MAKING AND GENERAL MANAGEMENT OF SPARKLING CHAMPAGNE WINE.

A report made by M. Herpin, from the Committee on the Economical Arts, upon a memoir presented by M. Boyer, on the making of the sparkling white wines of Aï.

Gentlemen:—It was formerly believed that sparkling was a quality peculiar to the wines of Champagne; the discoveries of pneumatic chemistry have taught us that this sparkling which is in such high request, is produced by the escape of carbonic acid gas condensed in the liquor, and that to obtain sparkling wine, it is sufficient to bottle it before the imperceptible fermentation is complete.

In fact, in many of our departments, and particularly in Burgundy, the preparation of sparkling wines has been attempted with success: yet Champagne supports the competition with that superiority which is given by a suitable soil and proper vine-stocks, and cultivation by skilful and practised laborers, and finally by a certain method improved and established by long experience.

M. Boyer, long a comptroller of the indirect taxes, has taken advantage of his situation and of his residence in Champagne, at Aï itself, to study the process followed there in the production of sparkling wines. His memoir upon this subject gives interesting details which it seems useful to us to publish.

The sparkling white wine of Champagne is made of black or white grapes of the first quality; they are gathered with care, and carried immediately, cautiously, and without being shaken to the press: they are immediately crushed to prevent the juice from fermenting and becoming colored. The liquor produced by the first pressing is kept separate—this is the best quality.

The wine is afterwards put into casks in which the fermentation is effected; about the middle of December it is fined and racked; it is fined and racked a second time about the month of March; afterwards it is bottled and the corks are tied.

Some months after they proceed to the clearing, *(dégorgement)* an important and delicate operation, the object of which is to remove the deposite which is formed in the bottles, and which injures the transparency of the liquor.

The clearing is performed in several different manners, of which each merchant makes a secret; this operation consists, generally, in bringing by degrees towards the neck of the bottle the deposite which is formed in the wine. When this deposite is collected near the cork, that is suddenly drawn, and the sediment permitted to escape, after which the bottle is filled up again and corked anew; some months after a second clearing is made, and sugar-candy and brandy are added to the wine.

It is not till after fifteen or eighteen months after bottling, that the sparkling white wine is supposed to have received the perfection requisite for its exposure to sale.

Such in a few words, gentlemen, is the general process for the preparation of the sparkling wines of Champagne. M. Boyer enters into lengthened details on the greater number of these operations, and describes a new method of clearing, to which many merchants give the preference.

I have the honor to propose to you in the name of the Committee of the Economical Arts,

1st. That M. Boyer receive the thanks of the society for his communication.

2nd. To insert in the Bulletin an extract from the memoir of M. Boyer.

Approved in the sitting of 6th March, 1833.

Signed,

HERPIN, *Reporter.*

MEMOIR ON THE MAKING OF THE SPARKLING WHITE WINES OF AI.

To make the sparkling white wines of Aï, the ripest and soundest black grapes are gathered, (the white being destined only for ordinary wine,) rejecting such as are dry, rotten, or bruised, they are put into large panniers which are carried on the backs of horses, taking care to cover them to protect them from the heat of the sun: in the courts or gardens near the press, these panniers are set in the shade.

If the sun heats the atmosphere too much, and dries the grapes so as to occasion the commencement of a fermentation, the panniers are slightly watered; the object of the watering in this case is to hinder the wine from turning yellow in the making.

Operations.

To make the sparkling white wine of Aï, the grapes are not detached from the clusters.

The vintage vat is first washed and well cleansed, and then the nuts and screws of the press are carefully examined and well greased.*

After these preliminary operations, the panniers of grapes are brought to the press. The fruit is poured into the vat on the evening, or sometimes in the following morning after it is gathered. The press is filled according to its strength and dimensions, that is to say, with from about twenty to forty panniers; this operation is called forming and filling a *marc* of grapes to make a *sac*. Forty panniers of grapes yield from nine to ten *pièces* (or casks) of white wine, each cask containing two hundred bottles.

When the filling is finished, three successive pressings are given; each of these pressings lasts from twenty-five to thirty minutes, together an hour and a half at most; a longer time would color the wine. The juice which flows spontaneously from the grapes is called *mère goute.*

For the second operation the press is loosened, the surface of the liquor (or *must*) is skimmed, and all impurities removed, even the stems of the clusters which have been pressed, and which cover its surface: this skimming is repeated after every pressing.

The edges of the *marc* which, by the pressure, is enlarged and misshapen, are trimmed; the trimmings are cast upon the mass; and then they proceed to a second and a third pressing.

The wine produced by the first pressing is called *vin de pressoir en pur noir.* As there is *must* still remaining in these *marcs* they are trimmed again and receive another pressing, which is called *première taille*; the wine produced from it often enters into that of the best quality (*de choix*;) it is allowed to drain. The second pressing is called *seconde taille* or *vin de tisane.* If a third pressing is given, its product is a poor and harsh wine.

At each pressing the grape juice flows into a small vessel, called the *barlon*, placed for this purpose under the press. The first pressings being given, the *must* which proceeds from them is called *vin d'elite, vin de choix*, and improperly *de cuvée*; this *vin d'elite* which has flowed into the *barlon* is carried into a tub where it remains all night to deposite its first lees, considered as the first fermentation which does not take place till after the pressing. It is now that the wine becomes white.

This first fermentation is indicated by the presence of a mucous or floating scum, called *cotte*, which is formed on the surface of the *must*; the wine which becomes clear allows the bottom of the tub to be seen. After the pressing, (qu. fermentation?) the wine is carried to be put into puncheons, which have been fumigated with sulphur after being well rinsed. At this moment, and if there is occasion, the makers pour into the cask a bottle of Cognac brandy, in order to give the wine more body and to prevent too great a fermentation; by these means the maker obtains, besides, the advantage of preserving the lusciousness of the wine. The first pressing is set apart.

The two next pressings give the *vin de pressoir.* Afterwards comes the *vin de rébèchage*, so called, because the pressmen spade and break up, and prepare for more complete draining (*emetisent*)

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* The substance employed is a composition of oil and *mine de plomb*, (a mineral resembling talc and of which crayons are made) or soap alone is used.—Tr.

the *marc* of grapes, which is pressed again two or three times, as well as the rest: for it is important that the *marc* be entirely dried.

The wines of the first, second, and third pressings, are carried successively and put into the puncheons in the order of their extraction from the press, as has been intimated above.

Finally, in certain cantons, only three successive and rapid pressings are given; in others but two; in all cases, however, it is necessary that the three operations should be performed within the space of an hour and a half at the most.

The white wine which has been put into the puncheons enters into a fermentation, violent at first, and subsiding into an imperceptible fermentation. By pressing the *marc* more or less briskly *(vivement)* the fermentation is increased or diminished. About the end of December, by which time the wine has undergone a proper elaboration, it becomes clear, and in fine dry frosty weather it is racked. It is always contrived to keep the wine in an equal temperature before bottling it, by which care it is obtained equally purified.

Fining.

To fine the white sparkling wines and the rose colored, (which will be spoken of hereafter) isinglass from Russia or Marseilles is used, this is melted with a little cream of tartar, (supertartrate of potash) or sometimes with alum, when the red wines appear difficult to clear. The mixture is put to steep in water and squeezed with the fingers or palms of the hands; the water becomes white: the eighth of an ounce *(gross)* of isinglass is sufficient for a cask.

The wine is racked a second time in March, and sometimes fined again if it seems to require it, but the quantity of isinglass is less than that employed in the first fining. This second racking is usually made fifteen days before the wine is bottled.

To increase the richness of the wine a cordial *(caramel vineux)* is made, composed of sugar-candy and white wine clarified.

Rose colored wine.

When it is desired to make rose colored wine, the grapes are squeezed and gently stripped from the clusters, they are shaken and left in a state of fermentation; afterwards they are carried to the press and receive the same pressings as for the sparkling white wines. This wine is set to work with raisins which color it.

The bottling and formation of the piles.

The wine is not bottled till towards the end of March; this operation being finished, the corks are tied with common twine and iron wire, and then the piles of bottles are formed. For this purpose, laths are placed upon the ground horizontally and in two parallel lines, at such a distance that the two ends of the bottles may rest fixed and solid; two rows of bottles are placed in opposite directions; then other laths are fixed on these two first rows, and on these last laths other bottles, and so in succession to the desired height of the pile. This height is perpendicular, and pretty generally from three to four feet, that is to say, the piles are raised to the height of from ten to fourteen diameters of the bottoms of the bottles. There are piles of which the length does not appear to be fixed; their thickness also seems to be arbitrary, yet they are calculated at two bottles abreast, after which an interval of about a finger is left between the piles for the circulation of air.

Of the breakage.

The breakage which the makers suffer commences in March, and continues in May, and sometimes till the wine is ready for sale. This breakage, which has not yet been sufficiently studied, has appeared hitherto to be a simple effect of fermentation; it is not felt by the maker unless it exceeds twenty per cent.*

New method of purifying the wine or for the clearing (dégorgement) *from the sediment.*

After the bottling, preparations are made for clearing off the sediment formed in the bottles. For this, the bottles are placed upon racks, or planks pierced with lengthened oval holes, with a neck; the bottles are inclined towards their mouths, this inclination is supposed to be of about thirty degrees.

When it is designed to collect the sediment which the wine contains, the bottle is shaken, without being moved out of its place, by turning it as gently as possible, one-third of its largest diameter.† These three circular motions given with equal dexterity and skill, force the sediment to collect together, and the inclination of the bottle causes it to be fixed upon the cork.‡

When it is well ascertained that the sediment is collected upon the cork, the bottles are taken one after the other to examine the clearness of the wine, which is then said to be without any trace of light *volland.* This word, purely professional, signifies stain or shade of a sediment of a dark color.

If the wine is in a proper state, they proceed to the clearing.

The clearing (Dégorgement.)

The person who performs this operation takes the bottle which is to be cleared, lays it along upon his left arm, and after having inverted it, holds it in a perpendicular position. Provided with a small instrument which he holds in his right hand, he breaks suddenly the twine and wire which confine the cork; this forcible breaking by shaking the cork, permits the gas to expand and force the cork out of the bottle. At this moment the sediment is disengaged, and falls all together into a vessel placed to receive it. The operator supposing the sediment completely discharged, restores the bottle to its upright position by a quick and dexterous turn of the hand, and examines it

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* M. Herpin has observed that the breakage may be much diminished by filling the bottles only two-thirds or three-quarters full during the whole time necessary for the *clearing* of the liquor.

† Not more than thirteen years ago, they took the bottle in the hand and shook it; this shake, always too violent, did not allow the wine to free itself entirely of its sediment; and hence it was never obtained perfectly clear. We are indebted for the new process to four Germans, who taught it to *Madame Cliguot* of Reims, who for many years has derived great advantage from it.

‡ The original is not clear in this, for there is no previous mention of the three circular motions.—Tr.

the wine is perfectly clear; in which case, he hands it to the workman whose business it is to fill up the bottles after the removal of the sediment. This filling up is made either with the wine of commerce *(commerçable)* or with brandy. If brandy is used, the proportion is one, one and a half, two, and four per cent. The bottles are corked again with new corks well selected, which are compressed by an iron machine, made to open and close by the action of the right foot; the workman turns the cork in the machine with his right hand. If, on the contrary, corks which have already been used, are employed, they are slightly steeped in brandy. The corks are tied again in the same way as at first.

If there is occasion, the bottles are put in piles again for a new clearing, and if after this, the wine is not perfectly clear and transparent, it is put aside to be carried through a new course of operations. The wine is not brought into market till fifteen or eighteen months after it is bottled.

Mixture or composition of the white wine of Aï.

It is the nature of the wine of Aï, unmixed, to be sparkling when it is not too luscious; but if pure it would be too dear. To obtain that sparkling which is so agreeable at the table, it has been necessary to seek long, and to try many combinations before arriving at that now employed.

The wines of Aï, of Pierry, of Vergenay, of Craman and of Avize united, form what the makers call a *cuvée*; these wines enter into the composition in the following proportions. The wine of Aï is six-twelfths; the other six-twelfths have not a well ascertained proportion among the other wines. This results from the apparent nature of the primitive wine, that of Aï.

Particular qualities of these wines.

The wine of Aï is very strong and very luscious.

The wine of Verzenay is heady and dry, it has the property of preventing the liquor from turning oily.

That of Craman, very luscious, would by itself occasion oiliness, it is employed only for its peculiar quality, a taste of muscat wine; it also occasions sparkling.

The others, which are the product of the white grape, an acid grape, have the property of preventing the wine of Aï from becoming oily, and of contributing to its sparkling quality.

From the Portsmouth Journal.

LUNAR INFLUENCE.

If the tides of the ocean are raised from their fathomless bed by the power of the silver moon, it is not too much to believe that the tides of the atmosphere are subject, in a great degree, to the same mysterious influence.

In tropical climates especially, the power of the moon over animal and vegetable life, is believed by many to be very great, and why not in other portions of the globe also? It is stated by a learned writer that in Demarara there are thirteen springs and thirteen autumns every year; for so many times does the sap of the tree ascend to its topmost branches and descend to the roots. For example, the *wallaba*, a resinous tree common in Demarara, and somewhat resembling the mahogany, if cut down in the dark, a short time before the new moon, is one of the most durable woods in the world for building purposes; in that state attempt to split it, and with the utmost difficulty it will be driven in the most jagged, unequal manner; cut down another tree of the same kind, at *full moon*, and the tree, it is said, can readily be split into the finest smooth shingles, or into staves for making casks; but in this state if applied to building purposes, it speedily decays. Bamboos as thick as a man's arm, if cut at the dark moon, will endure ten or twelve years; if at full moon, they will be rotten in two or three years; and thus it is with most of the forest trees. If these statements can be relied upon, they would seem to afford an important practical hint to those engaged in getting out and preparing shipping timber from extensive forests in our own country. Have any experiments ever been tried, or any facts noticed by ship builders upon the subject? It is true, we believe, that the timbers of our public vessels oft times rot while yet on the stocks and before they are completed. May not the circumstance be attributed to the particular season and particular age of the moon when the timbers were felled in the forest.

From the Cultivator.

RIBBON GRASS.

The ribbon grass of our gardens, *Phalaris Americana*, is likely to become of great value in our husbandry; it has been found to be better adapted to wet boggy grounds than any other species of grass; to propagate rapidly, either by its seeds or by its roots; to yield a very large product in hay or pasture, and to be well adapted to farm stock. The first suggestion of this fact came to us in a letter from Abedn. Robinson, of Portsmouth, N. H., who says the discovery was accidental.

"A neighbor," he says, "wishing to get rid of some of the roots which encumbered his garden, threw them into a bog, where they took root, and spread over a large space of ground, excluding every other plant. The water flows through the roots at all seasons. The turf has become so solid as to bear a cart and oxen. I walked through this grass when in bloom, and never beheld a more handsome and luxuriant growth. It stood perfectly erect, full of large leaves, even, and from four to five feet high. It will produce two good crops in a season, and springs up immediately after the scythe. It produces excellent food; cattle feed it close, and appear to be more fond of it when made into hay than any other grass. I have spoken for one-half of the roots of the patch, and have ground ploughed in my meadow in which I intend to transplant them, at about the distance of corn hills."

On a recent visit from the Hon. E. Goodrich, of Hartford, we were happy to receive, from that gentleman, a confirmation of the good opinion of the Phalaris which had been induced by Mr. Robinson's letter. It has been found as beneficial in Connecticut as in New Hampshire. Not recollecting the particulars narrated, we would beg of Mr. Goodrich, when he sees this, to forward them to us, in order that we may publish them correctly. The subject merits further attention; and if our

anticipations are not irrationally founded, the Phalaris Americana will yet become the gama grass of the north. It is truly perennial, spreads rapidly, and may be innoculated in the manner suggested by Mr. Robinson, especially in a soil saturated with water, with great facility, and at trifling expense.

From the Entomological Magazine.

ON THE APHIS, &c.

The true blight or Aphis is a quite, dull stupid-looking insect, mostly without wings, but sometimes it has four, two of which are much larger and longer than the other two, and fold over and hide them, reaching beyond the body, and meet together behind it. These wings are generally as clear as crystal, with a few veins in them, yet if you hold the insect in the sunshine, and examine him through a glass, you will find they take all the colors of the rainbow: you will also find he has a long trunk or sucker, which is used as a pump or syphon, through which the sap of plants is drawn. I have sometimes seen this sucker so long as to pass under the breast and legs, and reach a considerable distance behind the body, but it is not generally so. All blights infest the young and juicy shoots and leaves of plants, for the purpose of sap-sucking: and the plants honored by their operations forthwith play the most amusing and incredible vagaries: bearing blossoms instead of leaves, leaves instead of blossoms: twisting into corkscrew stems which ought to be straight, and making straight as sticks those which, like the scarlet runner and hop, ought to twine; as in the peach, making the leaves hump up in the middle, and causing the tree to look as though it had a famous crop of young fruit; making apple trees bear blossoms on their roots, and causing roots to grow out of their young shoots; and, by tormenting orchards in this way, preventing the fruit from ripening, and making it woolly, tasteless, and without juice. Our China asters often owe a good deal of their beauty to these vermin; they act as a spur to make them blossom beyond their strength and nature, and then die off without bearing seed. It is amusing to see with what regularity the blight station themselves on the young shoots of the Guelder-rose, crowding so close together that not a morsel of the rind is to be seen, and not unfrequently forming a double tier, or two thicknesses; the poor sprig losing its former unbending upright position, and writhing itself into strange contortions.

Blights are of all colors, but green is their most fashionable hue; those of broad beans are black as soot, and velvety; and these, if attended to, do but little harm; they cluster at the very top, and each bean should be lopped just below the blight, and the top carried away and burnt, not thrown on the ground, or else they are sure to climb up the bean stalks again, and, stopping here and there at the best landing place, to increase and multiply, thus soon covering the whole plant; nor should they be buried in the ground, for they take care to outwit you by living under ground for months, and, when the gardener's spade turns them up again, they make for the beans directly; the plan of lopping the beans does not injure the crop, qut, if carefully done, rather improves it. The blight of the willow is very large, and, at first sight looks grayish, but under a glass is beautifully variegated with black and white; when crushed it gives out a deep blood-colored die, which stays on your hands several days, in spite of frequent washings.

I have taken a good deal of pains to find out the birth and parentage of true blights; and for this purpose have watched, day after day, the colonies of them in my own garden, and single ones which I have kept in-doors, and under tumblers turned upside down. The increase is prodigious; it beats every thing of the kind that I have ever seen, heard, or read of. Insects in general come from an egg; then turn to a caterpillar, which does nothing but eat; then to a chrysalis, which does nothing but sleep; then to a perfect beetle or fly, which does nothing but increase its kind. But blights proceed altogether on another system; the young ones are born exactly like the old ones, but less; they stick their beaks through the rind, and begin drawing sap when only a day old, and go on quietly sucking away for seven or eight days; and then, without love, courtship, or matrimony, each individual begins bringing forth young ones, and continues to do so for months, at the rate of from a dozen to eighteen every day, and yet continues to increase in size all the while: there seem to be no males, no drones, all bring forth alike. Early in the year these blights are scattered along the stems, but as soon as the little ones come to light, and commence sap-sucking close to their mother, the species get filled up, the old ones look like giants among the rest, as here and there an ox in a flock of sheep; when all the spare room is filled up, and the stalk completely covered. The young ones, when they make their first appearance in the world, seem rather posed as to what to be at, and stand quietly on the backs of the others for an hour or so; then, as if having made up their minds, they toddle upwards, walking on the backs of the whole flock till they arrive at the upper end, and then settle themselves quickly down, as close as possible to the outermost of their friends, and then commence sap-sucking like the rest; the flock by this means extends in length every day, and at last the growing shoot is overtaken by their multitude, and completely covered to the very tip. Towards autumn, however, the blights undergo a change in their nature; their feet stick close to the rind, their skin opens along the back, and a winged blight comes out—the summer generations are entirely wingless. These are male and female, and fly about and enjoy themselves; and, what seems scarcely credible, these winged females lay eggs, having first lived through the winter; and, whilst this operation is going on, a solitary winged blight may be observed on the under sides of the leaves, or on the young shoots, particularly on the hop, and differing from all its own progeny, in being winged and nearly black, whereas its young are green and without wings. In May, a fly lays a lot of eggs; these eggs hatch and become blights; these blights are viviparous, and that without the usual union of sexes, and so are their children and grandchildren, the number of births depending solely on the quantity and quality of their food; at last, as winter approaches, the whole generation, or series of generations, assume wings, which the parents did not possess, undergoes frequenly a total change in color, and in the spring, instead of being viviparous, lays eggs.

You will never find a plant of any kind infested with the aphis, without also observing a number of ants and ladybirds among them, and also a queer-looking insect, like a fat lizard, which is in fact the caterpillar of the ladybird. The connexion of the ant and the aphis is of the most peaceful kind that can be conceived; their object is the honeydew which the aphis emits; and, far from hurting the animal which affords them this pleasant food, they show it the greatest possible attention and kindness, licking it all over with their tongues, and fondling it, and patting it, and caressing it with their antennæ in the kindest, prettiest way imaginable. Not so the ladybird, or its lizard-like caterpillar: these feed on the blights most voraciously, a single grub clearing a leaf, on which were forty or more, in the course of a day. The perfect ladybird is a decided enemy to them, but not so formidable a one as the grub. The eggs of the ladybird may often be seen on the hop leaf; they are yellow, and five or six in a cluster placed on their ends; these should on no account be destroyed, as is too often the case; but, on the contrary, every encouragement should be given to so decided a friend to the hop-grower.

Besides the ladybird and its grub, there are two other terrible enemies to the poor aphis; one of which is a green ungainly-looking grub, without legs, which lies flat on the surface of the leaf, and stretches out its neck just like a leech, till it touches one of them; directly he feels one he seizes it in his teeth, and holds it up wriggling in the air, till he has sucked all the goodness out of it, and left it a mere empty skin. This curious creature turns to a fly [one of the Sylphidæ, *Ed. Ent. Mag.*,] which has a body banded with different colors, and which in summer you may often observe under trees and about flowers, standing quite still in the air, as though asleep, yet, if you try to catch him, darting off like an arrow. The other has six legs, and very large strong curved jaws, and is a most ferocious-looking fellow, strutting about with the wings of the blights which he has killed on his back. This fierce fellow comes to a very beautiful fly [Chrysòpa Pêria, *Ed. Ent. Mag.*] with four wings, all divided into meshes like a net, and two beautiful golden eyes. All these creatures, which thus live on the plant lice, have a very strong and disagreeable smell in the perfect state.

For a favorite plant infested with blight there are several remedies—smoke of tobacco, snuff, &c.; but the most effectual, and the least hurtful to the plant, is to let it stand in the tank of cold water for half an hour, when all the blights will leave it, and swim on the surface of the water.

From the United States Gazette.

FLOUR OF SLIPPERY ELM.

Being in the country a few days since to visit a sick friend, I was shown an article entirely new to me, which is said to be remarkably nutricious and palatable, for debilitated and sick persons. It was flour prepared by the shakers, from slippery elm, and used, the same as arrow root. One table spoonful of this flour boiled in a point of new milk, is excellent to feed infants weaned from the breast; they will not only fatten upon it, but it will prevent bowel complaints. It makes an easy and nutricious diet for consumptive and dispeptic persons. From the character I received of it, I presume that it only need be known to become of general use. It is sold by Isaac Thompson, druggist, corner of Market and Second streets.

From the New England Farmer.

ON THE CULTURE OF HOPS.

In compliance with repeated requests, we propose to devote a column or two to remarks on the culture of hops, preparing them for market, &c.

An excellant article on this subject, written by Wm. Blanchard, Jr. Esq. was first published in the New England Farmer, vol. 11, p. 52; and has been since republished in *Fessenden's Complete Farmer*, p. 149. Mr. Blanchard observes, that the soil best calculated for the production of hops is a sandy loam, rather low and moist; but states that he has seen very fine crops raised on very different soils. Plough the land 9 or 10 inches deep in October—harrow thoroughly in the spring in the same direction the land was ploughed—manure at the rate of about 16 cords to the acre, or more if the land be much reduced. Cross plough the land to nearly the same depth—furrow as for planting corn, the furrows at least four feet apart—plant corn or potatoes, (potatoes preferable,) the first year with the hops. Plant every other hill in every other row with hops, thus placing the hills of hops at least eight feet apart—put four cuttings from the running roots about eight inches in length, into each hill, and cover them the common depth of potatoes—keep the hops clear from weeds, by hoeing. In October cover each hill with a shovelfull of compost manure, that from the hog-stye preferred—in each following spring, before the hops are opened as it is termed, spread evenly over the yard about eight cords of manure to the acre, (that which is coarse and strawy is preferred,) plough the land both ways at the first hoeing—but three hoeings in a season, unless necessary to subdue weeds. The last time of hoeing about the beginning of August, or when hops are in full blossom.

"After the first crop it is necessary to open the hops every spring by the middle of May; which is performed by making four furrows between the rows, turning the furrows from the hills, and running the plough as near the same as possible without injuring the main roots. Then the earth is removed from the roots with a hoe—all the running roots cut in with a sharp knife, within two inches of the main roots—the tops of the main roots must also be cut in, and then the hills covered with earth about two inches deep."

The poles should be set as soon as the hop vines appear, which will save labor in tying up the vines. Mr. B. allows but two vines to a pole, and two poles to a hill—poles not to exceed sixteen feet in height. The most thrifty vines must be selected and trained to the poles by fastening them by a piece of yarn slightly twisted together by the thumb and finger. Frequent attention is necessary to tie up the vines, as they are subject to be blown off by high winds. The hops are ripe about the beginning of September, and should be immediately gathered, or the crop is lost. The quality of the hops depends much on their being picked clean from leaves and stems. The picking may be done by women and children, having one

man to a bin to handle the poles and to inspect the pickers. The bin is a wooden box, about nine feet long, three feet wide, and two and a half feet high, made of thin pine boards, that it may be easily moved over the yard, across which the poles are laid, and into which the hops are picked by hand. Care should be taken when gathering the hops, to cut the vines two feet from the ground, that the roots may not be injured by bleeding.

The most important part in the management of hops, is the curing and drying of them. Hops always grow first sort; second sort, and refuse hops are made so by unfortunate or unskilful management.

Much depends on a well constructed kiln. The side of a hill is its best situation for convenience of putting the hops on the kiln. It should be in a dry place. The kiln should be dug out the same bigness at the bottom as the top; the side walls laid up perpendicularly, and filled up solid with stone to give it a tunnel form. Twelve feet square at the top, two feet square at the bottom, and at least eight feet deep is deemed a convenient size. On the top of the walls sills are laid having joists let into them in like manner as for laying a floor—on these joists, laths about one and a half inches wide are nailed, leaving open spaces between them three-fourths of an inch, over which a thin linen cloth is spread, and nailed at the edges to the sills. A board about twelve inches wide, is set up on each side of the kiln, on the inner edge of the sill, to form a bin to receive the hops. The larger the stones made use of in the construction of the kiln the better; as it will give a more steady and dense heat. The inside of the kiln should be well plastered with mortar to make it completely air tight. Charcoal (that made from yellow birch or maple I should prefer,) is the only fuel proper to be used in drying hops. The kiln should be well heated before any hops are put on, and carefully attended to keep up a steady and regular heat.

Fifty pounds of hops when dried, is the largest quantity that should be dried at one time, on a kiln of this size; and unless absolutely necessary to put on that quantity, a less would dry better. The green hops should be spread as evenly and as light as possible over the kiln. The fire at first should be moderate, but it may be increased as the hops dry and the steam is evaporated.

Hops should not remain long in the bin or bag after they are picked, as they will soon heat and become insipid. The hops should *not* be stirred on the kiln until they are completely dried. They should then be removed from the kiln into a dry room and laid in a heap, and there remain unmoved and unstirred, until bagged, which is done with a screw, having a box made of plank, the size the bag is wished, into which the cloth is laid, and the hops screwed into the box, which is so constructed that the sides may be removed, and the bag sewed together while in the press.

The hops after laying a few days will gather a partial moisture called a sweat. The sweat will probably begin to subside in about eight days, at which time and before the sweat is off, they ought to be bagged in clear dry weather. As the exact time when the hops will begin to sweat, and when the sweat will begin to subside or dry off (the proper time to bag them,) will vary with the state of the atmosphere, it will be necessary to examine the hops from day to day, which is easily done by taking some of them from the centre of the heap with your hand. If on examination you find the hops to be very damp and their color altering which will be the case if they were not completely dried on the kiln, and not othwise, you must overhale them in the air.

The most convenient size for a bag of hops to handle and transport is about five feet in length, and to contain about 250 pounds. The best bagging is coarse strong tow cloth of our domestic manufacturing; next to that Russia hemp bagging. The East India sugar and gunny bags, so called, ought never to be used. The sugar bags, are of an unreasonable weight, and both they and the gunny bags are of no value to the brewer, whereas the other bags are worth prime cost.

It is now common for those who have entered considerably into the cultivation of hops, to build houses over their kilns, which in wet weather, are very convenient; otherwise a kiln in the open air would be preferable. It is necessary to have these buildings well ventilated with doors and windows; and to have them kept open night and day, except in wet weather, and then shut those only which are necessary to keep out rain. If a ventilator was put in the roof of the building, directly over the centre of the kiln, about six feet square, it would be very advantageous. I have seen many lots of hops much injured both in color and flavor, by being dried in close buildings.

Where the houses over the kilns are built large, for the purpose of storing the hops as they are dried, which is a great saving of labor, a close partition should be made between the kilns and the room in which the hops are stored, to prevent the damp steam from the kilns coming to them, as it will color them, and injure their flavor and quality very much.

Many of our farmers will object to the mode here recommended of manuring hops, their common practice being to put the manure in the hills, when they plant the hops, and afterwards to apply the manure on the hills at the first and second hoeings. Mr. B. thinks that the manure in the hills has a tendency to produce worms, and its fermentation at their roots to cause their decay; and that a hop yard manure in the manner he directs will continue in a fertile state for many years. He also supposes that the quantity of manure recommended will be objected to by many. Where hops have been cultivated many years, farmers complain that the quantity raised per acre does not exceed one-half as much as was raised by their ancestors on the same land. Hops I believe, in common with all sorts of grain and vegetables flourish best and produce the finest crops, when cultivated on new lands, which required little or more manure—and such were the lands their ancestors cultivated. The same complaints I presume would be made against all sorts of grain and vegetables if raised with little or no manure, on lands which have long been cultivated. No crop can be more improved and increased by high cultivation than hops.

VALUE OF HOPS.

The Bangor Republican says there are farmers not thirty miles from Bangor, who have taken a thousand dollars in cash, as the clear income from their crop of hops the present season.

For the Farmers' Register.

ON THE ROAD LAW OF VIRGINIA—NO. I.

The people of Virginia have one feature in their national character which has scarcely attracted observation or remark, but which undeniably exists, and exerts a powerful influence on their legal and general policy. This is our ready submission (if not attachment) to established and long existing legal regulations, and our opposition, no less strongly marked, to whatever is new, and untried by ourselves, however well known, and highly approved, by other communities. A certain degree of this steadiness is valuable—and I am willing to acknowledge that Virginia owes to the feeling which causes it, much of her high political character. We are altogether free from the sudden and complete political changes of views and policy which are often exhibited in some of our sister States—and we thereby give to them this lesson in government, (which they fully return to us in practical and economical matters,) that steadiness and perseverance in a course, even though it be not altogether the best, is more likely to succeed than great and frequent changes. But every thing may be carried to an injurious extreme: and to this extent I conceive we carry our approval of, or submission to old institutions, and our violence of objection to innovations. There are legal provisions on our statute book, (*sleeping* there very harmlessly in most cases, I admit) which have regularly been approved and retained at each deliberate revisal of the code—and which could not be repealed without a continued struggle maintained for years together—but which, if just now proposed, could not possibly be enacted—and indeed, as to some of them, the very attempt to have them enacted, would put the whole commonwealth in a ferment. It is not my purpose to take a general, or extended view of this subject, nor to notice particularly, even the most remarkable examples in our laws—but to ask attention to *one example* which has practical ill effects bearing upon all, and daily felt, and which are endured for no other reason except that they have been long borne, and that our shoulders are now accustomed to the burden. I allude to the *road law as enacted*—and still more to the *road law as usually executed.*

Before proceeding with particular remarks, I will quote those sections of our law respecting public roads, which prescribe the duties of the surveyors, the means which they are empowered to use, and the manner in which these means are to be applied for the important object of preserving the roads in the best condition for the public use and benefit.

"4. The several courts shall also divide all the public roads into precincts, and, as often as it shall be necessary, appoint a surveyor over every precinct, whose duty it shall be, to superintend the road in his precinct, and see that the same be cleared, and kept in good repair; which surveyor shall continue in office, until another shall be appointed by the said court in his stead.

5. All male laboring persons, of the age of sixteen years or more, except such as are masters of two or more male laboring slaves of the age of sixteen years or more, shall be appointed by the court to work on some public road. For every person so appointed, who, when required by the surveyor placed over him, shall, without legal cause or disability, fail to attend, with proper tools for clearing the road, or shall refuse to work when there, or to find some other person equally able, to work in his room, the sum of one dollar and twenty-five cents for every day's offence, shall be paid, by himself, if he be a free man of full age; if an infant, then by his parent, guardian or master; and if a slave or servant, then by his overseer, if he be under one, or otherwise, by his master: 'and be recoverable by the surveyor, with costs, before a justice of the peace, and by the said surveyor to be expended, after deducting the amount of his costs in all such cases, in which he may warrant or give information, in the improvement and repair of the road, for failing to work on which the penalty was incurred."

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"7. Every surveyor of the road, shall cause the same to be constantly kept well cleared and smoothed, and thirty feet wide at the least; 'unless the court shall, by order entered of record, authorise a less width;' and, at the fork or crossing of every public road, shall cause to be erected, and kept in repair, from time to time, a stone, or, otherwise, an index on a post or tree, with plain inscriptions thereon, in large letters, directing to the most noted place, to which each of the said roads shall lead, and may take stone or wood for that purpose from any adjoining land; and, for the expense of setting up and inscribing such stones, posts or indexes, and keeping them in repair, the surveyor shall be reimbursed by the county court, in their next succeeding levy; and, where bridges and causeways are necessary, the surveyor shall cause them to be made twelve feet broad at the least, convenient and safe, and shall keep the same in repair, and for that purpose may cut and take from the lands of any person adjoining, such, and so much timber, earth, or stone, as may be necessary, the same being first viewed and valued by two honest house-keepers, appointed and sworn for that purpose, by a justice of the peace, unless the owner shall freely give such timber, stone or earth for that use; but, where a road leads through a city or town the surveyor shall not take any timber, stone or earth, from any lot within the town, without the permission of the owner, but shall take the same from the lands nigh or adjacent to the said town, where it will do the least injury to the proprietor; and where the assistance of wheel carriages is necessary, for making or repairing any causeways, any justice of the peace may issue his warrant, under his hand and seal, for empowering the surveyor to impress such necessary carriages, draught horses, or oxen, with their geer and driver, belonging to any person, who, or their servants or slaves, are appointed to work on the road, and appointing two honest house-keepers, who, being sworn, shall value, by the day, the use of such carriages, draught horses and oxen; which valuation, with a certificate from the surveyor, how many days the said things were employed in the work, shall entitle the owner to an allowance for the same, in the next county levy. And, in the like manner, shall the owner of timber, stone or earth, taken for bridges or causeys, be entitled to the valuation thereof, in the next county levy, upon a certificate from the two house-keepers who valued the same. And, hereafter, every surveyor of a road, who shall fail or neglect to perform the du-

ty hereby required of him by law, shall forfeit and pay a sum not less than ten, nor exceeding thirty dollars. And the surveyors of the roads now acting, or that may be hereafter appointed, shall be entitled to receive such reasonable compensation, to be adjudged of by their respective county courts, not exceeding one dollar twenty-five cents for every day they may be necessarily employed in working on, and repairing the said roads, to be paid them out of the county levy.

8. 'The courts of the several counties shall have full power to levy so much money as will be necessary to pay for the removal, by gunpowder, of the obstructions of rock from the public road; and to apply the same in such manner for the purpose aforesaid, as they may deem expedient.'

9. Where a bridge or causey shall be necessary, and the surveyor, with his assistants, cannot make or maintain the same, the court of the county are empowered and required to contract for the building and repairing such bridge or causey, and to levy the charge thereof in their county levy."

The first and most obvious objection to the law, is the inequality and injustice of the manner in which the people are taxed for this great and important public work. It is altogether a *poll tax*—a tax levied upon the laborers of the country, without regard to the property of the tax payers—except in this, that the owner of laboring slaves usually is richer than his neighbor who owns none—though the possession of that kind of property is very far from being a correct measure of wealth. A merchant, manufacturer, or capitalist, (as such) pays not a cent towards the making and repairing our roads, though either may make as much use of them as the farmer and slave holder. The large wagon owner, where capital is altogether employed in the transportation of commodities, and the great mail contractors, and stage coach owners, who make more use of, and derive more profit from the roads than any other persons, are alike free from all contribution for their repairs and preservation. This is as impolitic as it is unjust—and like many other unjust taxes, it is so badly paid, that those exempted from payment by law become in fact the greatest sufferers. The labor for repairing roads is sparingly and grudgingly given, and so injudiciously applied, (for reasons which will hereafter be considered,) that it renders a still less amount of service: and the consequence is, that those who most use the roads, are compelled to pay a heavier tax in extra force of team, than would pay their fair proportion of the expense necessary to keep the roads in the best condition. In this way, we may fairly estimate our roads as among the most expensive in the world, (where natural advantages are equal,) although the money and labor judiciously bestowed for their repairs make a very small amount. This general truth will be evident to every one who has much practical acquaintance with the existing evils, though we may differ widely as to estimates of cost. But there can be little doubt, that any kind of fair and careful estimates will lead to this conclusion—that the present system of repairing roads is as injudicious as unjust—is wasteful of the means applied, and yet ineffectual: and that it is required by the interest of all classes—those exempted by the law from road labor, as well as those who are taxed to provide it—that a total change of law, and of the mode of operation should be made.

A small exception exists in the law, on the statute book, but not in its actual operation, to the entire exemption of a large part of the community from contributing to the repairs of public roads. The law requires road labor from "all male laboring persons, of the age of sixteen years or more, *except such as are masters of two or more male slaves* of the age of sixteen years or more." Now what is meant precisely by "laboring persons," I do not pretend to know: and if the law was new, and the phrase first so applied, the construction might cause much difficulty. But in practice, it has never been applied to require road labor (or substitutes, or fines in default,) of any who were employed in other than *field labor*. As the white field laborers in Lower Virginia are, unfortunately, very few, the hardship of subjecting these few to road labor was the more glaring—and latterly, they have no longer been called upon for this service—and thus they are exempted, not by an amendment of the law, but by the neglect of its provisions by the surveyors of the roads. In the mountain region, where white laborers are far more numerous, compared to slaves, this mode of repeal, by non-enforcement, has not yet taken place. This odious feature of the law was made much use of by the advocates for the change of of our former constitution, to show that the poor had not their proper weight in the government. But as if it had served its only use, and might be wanted to serve the same purpose again, no effort has been since made to change this part of the law—a change, by the way, which might have been obtained as easily under the old as under the new constitution, and which is practically (though illegally) made in that part of the State where the influence of the poor man is said to be least.

R. N.

MONTHLY COMMERCIAL REPORT.

There has been nothing particularly interesting in the commercial operations of the present month, with the exception of those in the great staple article, cotton; the price of which has continued to advance, until it has reached 16 cents in the Petersburg market. This advance is caused by the statements made of extensive injury to the crops, particularly in the Southern Atlantic States, and which was also reported to be the case with those on the Mississippi—but the latter report is contradicted, and some difference of opinion now exists whether the price will be supported, or whether a further advance will ensue. The quantity consumed in Europe is steadily on the increase, and should the recent attempts to supply the Chinese market with British cotton goods prove successful and profitable, a further increase may be counted on, which would prevent a recurrence of very low prices until the production shall overtake the demand.

The season for extensive operations in tobacco has passed, but the price of the article is maintained, and the quantity remaining in this country is smaller than usual.

The short crop of wheat in Virginia has had no effect on the price in the Northern ports, where the immense increase of supplies from the west, through the New York Canal, have furnished

more flour than is required by the limited demand for exportation. Some large sales of flour have been made by the Richmond millers at $6 per barrel—but the price of country flour is at and under $5.

The published reports of the importation of specie into the United States since the 1st of December 1833, exhibit an amount of nearly twenty millions of dollars. Recently the importation has ceased, and some silver has been exported. Spanish dollars now command a premium—reversing the state of things which existed previously to the change in the mint value of gold. Exchange on England is at 6¾ per cent. premium. Virginia Bank stock 110, Farmer's Bank 108. The stock of the Petersburg Rail Road which had been quite low in price, has appreciated nearly to par—a dividend of five per cent. having been ascertained for the last six months.

x.

Nov. 27th, 1834.

MOUNT VESUVIUS.

The most afflicting details of a recent eruption of Mount Vesuvius, have reached us. In a former account we stated that in August an eruption had taken place, which on the evening of the 25th began to subside. On the 27th, 28th, and 29th, new craters opened, and produced ravages awful to contemplate. Thousand of families were flying from their native land, old and young, dragging through heavy masses of heated cinders. Fifteen hundred houses, palaces and other buildings, and 2,500 acres of land, have been destroyed by fire. The village of St. Felix had been already abandoned.

The lava soon poured upon this place, and in the course of an hour, houses, churches, and palaces, were all destroyed. Four villages, some detached houses, country villas, vines, beautiful groves, and gardens, which a few instants before presented a magnificent spectacle, now resembled a sea of fire.

On the third instant, nothing but stones and cinder were ejected, and every prospect existed of the eruption being soon at a close. The palace of the Prince of Attayauno, and 500 acres of his land, are utterly destroyed. The cinders fell during an entire night over Naples, and if the lava had taken that direction, there would have been an end to that city.

From the Cultivator.

EXPENSE OF CURING HAY.

An accurate account of expense in different operations of farming, has heretofore been so little attended to, that in making out an estimate of cost of any one process of the many that are to be performed, the farmer has to be governed more by conjecture than by any rule of correct calculation. This deficiency is owing to his own neglect, and if he now suffers, as he must necessarily, from the evil, a little time and pains are all that are required to enable him hereafter to count the cost of any one process he may wish to have performed. It is as important to the farmer to know what ought to be the reasonable cost to have a piece of work done, as it is for the manufacturer to calculate the expense per lb. or per yard of carding, spinning or weaving, and we are well assured, that if the last is unacquainted with the expense of each of these processes, he is totally incompetent to carry on his business successfully. It is the same with the mechanic, and that one only, at this day, becomes wealthy, who is competent to make a correct account of profit and cost. Where a farmer does all his own work, it may not be so necessary to keep a debtor or creditor account, but when job work is to be done, as it must in a variety of cases, accuracy of cost is essential to the interest of all engaged. We do not hesitate to say, that a man who would keep a correct account of all the expenses and labor upon a farm, giving a separate page to each laborer, each lot, each horse, ox and cow, with the profits derived from each, and this system kept up for successive years, and extended throughout his whole arrangement, and published, would aid more directly the class of community to which he belonged, and it would give rise to more beneficial results, than the present opening of new canals, or originating other great improvements. We would then be furnished with a guide or table, from which we would calculate the expense of each operation and class of husbandry, and settle the many principles which are now left to reason, and, in many cases, to conjecture. It has been for many years, and is yet, a disputed point among the most intelligent farmers, whether the raising of grain or stock, where there are proportionate facilities for each, is most conducive to their interest, and we do not see that the controversy can be settled in any way, except by keeping the debtor and creditor account we have mentioned. It is useless to enlarge upon this subject. Doubt and uncertainly will always rest upon it, and we suffer from a continuance of the evil, until we adopt a better and more systematic manner of calculating all our expenses and profits. Our object at this time is, to give the expense of cutting hay, and it is as accurate as circumstances would allow. It would be better could we estimate the cost per ton, but as a farmer has not the conveniences, and does not weigh the hay intended for his own consumption, it would be difficult to say, with certainty, what is the cost of curing by weight. It is a common observation, however, that 20 feet square and one foot high of well packed hay, give one ton of 2240 lbs. by weight; how far it is correct, we have never had the opportunity of ascertaining. We have estimated it by the load, and a two horse load, with the wagon, or one with an ox cart, are considered equal—each load we put down as 12 cwt. of well cured hay, such it would turn out from the mow.

Cutting, curing and housing 126 cart loads of hay,		$143 00
do.	124 wagon do.	136 00
do.	38 cart do.	34 37
Total,	288 l'ds costing,	$313 37

Or $1 08¾ per load.

We give three different statements as the work was done on three different farms, and the first two under the direction of the persons living upon them who were hired tenants, and who employed men to work with and under them—the work was charged at $1 per day wages and board, which was the actual price. How far the tenants who had no interest in the hay, or were not charged with any part of the payment of the expenses, might, if they had been concerned in either or

both, by greater efficiency, been enabled to lessen the expense, we are unable to say: they were however, as competent as the better kind of day laborers, and as the farms were some distance apart, and there was no communication between the tenants, still the expense for the labor done on each is nearly the same. A revolving horse hay rake was used in both instances, and there was no charge for the use of the team to house the hay. Still we have no doubt that had the owner personally superintended the work, the cost would have been less; because his direct interest in lessening all expenses would have created facilities which did not occur to those less interested. In the last statement given, this was the case, for there we see 38 loads cured for $34, or about 90 cents per load; whereas the other two cost about $1 12 per load. We have heretofore made estimates of the expense of curing hay, and have uniformly made them at about $1 per load. Last year, the expense was rather less than this; for although the weather was not quite so dry for harvesting, yet as the heat was not so intense, laborers were enabled, on the whole, to do more, and this year, a mower had to go over more ground to obtain the same quantity of hay.

EXTRACTS FROM PRIVATE CORRESPONDENCE.

Sumpter, S. C. 10th Oct. 1834.

We are going on well as to rail roads, and with the spirit afloat, and the growing influence of the idea that the labor of the country may be used in lieu of money, gives me hopes that it will not be long before Petersburg and Norfolk will be connected with Charleston by one continued road. But we have also a spirit afloat, tending to a movement by far too rapid, because too expensive—that of an almost immediate use of locomotives.

This circumstance leads me to ask you to obtain for me the information, what has been the course of conduct pursued by the Petersburg and Norfolk Companies? Have they not forborne the use of steam till their work is completed?

I would also say to you that a great impediment exists here as to engineers. No sooner does a boy get the knowledge of the level, than he comes to the South, turns engineer, and charges his $10 per day. The Columbians paid $2,000 the other day for surveying sixty miles of ground. It took up twenty-seven days time, was performed by two engineers and thirteen assistants, with one wagon and four horses. Now this sum may be thus divided:

Engineers $10 per diem each, $270 or	$540
Wagon and team, - - - - -	120
Thirteen assistants $2 is $26 per day, or	702
Profit, - - - - - - -	638
	$2,000

Now, I apprehend in such a country as this, where, on the alluvion, the elevation will not exceed three feet in the mile; and as soon as the leaf falls, you may discover objects for miles, that many an intelligent young man would be able to give himself a good start, and serve companies at a low rate, always stipulating, that in the event of success, the payment should be correspondent; and *perhaps* as it would furnish the best pledge and the strongest test of his talent and zeal, to agree to take this *addendum* to his pay in road stock.

There is now a distant prospect of a rail road from Darlington Court House direct to Sumterville, and thence to ———, on the Charleston Rail Road, a distance of 120 miles, more or less. From Darlington Court House to Sumpter Court House, as far as Lynch Creek, the road is solid, and the country flat. Below it is flat, but perhaps not so solid. * * * *

—

Surry County, Oct. 20, 1834.

I take the liberty of sending you some samples of my marl. No. 1 was taken from the upper part of the bank, forming a stratum about four feet thick, and containing a substance in a crystalized state, which I at first supposed to be gypsum, but was soon convinced of my error from its being very easily decomposed by muriatic acid; and I am now at a loss to say what it is, unless it is crystalized lime. Sometimes shells are found with the hollow side up, filled with transparent crystals of a most beautiful appearance. * *

[These crystals were new to our observation—but our correspondent's application of a test led him to a correct conclusion. The substance is crystalized carbonate of lime—and has been thus formed by a previous solution of a portion of the shelly matter by rain water, which (as we are informed) contains carbonic acid, and the excess of this acid present forms a super-carbonate of lime, which is soluble in water. This is the form of the calcareous matter dissolved in limestone water, and which, by losing its excess of acid, is deposited in the crystals which decorate the caverns of limestone regions, and in calcareous tufa at the falls of running streams.]

—

Fairfax, Nov. 20th, 1834.

* * * * I am negociating for a large supply of ground bones, and wish you would insert in your following numbers what you may know, or what is said of them. English authority is various: but I have great confidence in it for most things.

—

Hanover, November 15th, 1834.

* * * * I have been long and successfully employed in the use of shell marl, and had noted, and should have published many of my observations, but the experiments mentioned in your Essay on Calcareous Manures, are so much more exact than mine, and so precisely in accordance with my experience, that there is nothing left for me to say on the subject. This statement I have always made when I have heard your book mentioned. * * *

[This concurrent testimony, even when thus generally and concisely stated, is very satisfactory to the individual to whom it is addressed—but it would add much to the estimated value of this manure, if the detailed experiments alluded to could be laid before the public. We know (from report) that the general and successful practice of our correspondent, together with his ample means for observation, would give his statements, whether general or in detail, a character of authority which would be exceeded by none.]

DIARY OF THE TEMPERATURE AND STATE OF THE WEATHER, FROM JULY 1, TO SEPTEMBER 30, 1834,—OBSERVED AT FORT MONROE.

JULY.	THERMOMETER. VII. A. M.	II. P. M.	IX. P. M.	WINDS.	WEATHER
1	77	88	80	S.	cloudy.
2	77	87	84	"	fair.
3	77	88	82	"	"
4	78	88	78	N. E.	rain.
5	78	89	76	"	cloudy.
6	75	87	80	S.	fair.
7	77	85	80	S. E.	cloudy.
8	78	87	82	"	fair.
9	79	85	83	"	"
10	78	81	78	"	cloudy.
11	75	82	73	N. E.	rain.
12	69	75	73	"	"
13	71	78	76	"	"
14	75	84	80	S. W.	fair.
15	76	83	78	"	rain.
16	77	85	79	S.	"
17	78	84	80	S. W.	"
18	74	80	76	N. E.	"
19	70	78	75	"	"
20	72	76	77	E.	fair.
21	72	80	79	"	cloudy.
22	76	91	82	S.	fair.
23	80	87	84	N. E.	"
24	81	85	83	"	"
25	75	88	84	W.	"
26	82	87	85	E.	"
27	81	92	86	"	"
28	84	87	84	N. E.	"
29	83	90	82	W.	cloudy.
30	82	83	80	N. W.	"
31	80	81	79	S.	"
				Total No. of degrees.	

AUGUST.	THERMOMETER. VII. A. M.	II. P. M.	IX. P. M.	WINDS.	WEATHER
1	79	84	82	S. W.	fair.
2	79	75	73	N. W.	"
3	74	79	78	N. E.	rain.
4	76	83	77	N.	fair.
5	75	80	79	N. W.	"
6	78	81	79	E.	"
7	78	81	80	"	"
8	78	86	81	S.	"
9	77	83	83	"	"
10	81	85	83	N.	"
11	82	89	86	S. W.	"
12	83	88	86	S.	"
13	83	87	87	"	"
14	84	86	83	N. E.	cloudy.
15	83	85	82	N.	fair.
16	77	78	77	"	"
17	77	78	78	S. W.	"
18	77	84	82	N. E.	"
19	82	78	75	N.	"
20	75	75	74	E.	"
21	75	77	76	S. E.	"
22	75	78	77	"	"
23	76	78	77	E.	"
24	78	84	82	"	"
25	78	78	77	N. E.	cloudy.
26	76	79	75	"	"
27	72	72	76	E.	"
28	74	77	75	"	"
29	73	76	75	"	"
30	75	79	76	"	"
31	76	76	75	"	rain.
				Total No. of degrees.	

SEPT.	THERMOMETER. VII. A. M.	II. P. M.	IX. P. M.	WINDS.	WEATHER
1	77	82	88	N. E.	rain.
2	76	86	79	N.	fair.
3	78	85	82	S. E.	"
4	79	84	80	S.	cloudy.
5	79	82	79	N.	rain.
6	79	82	84	S.	fair.
7	81	84	81	"	"
8	79	82	80	"	rain.
9	79	82	80	W.	fair.
10	74	77	75	S. W.	"
11	73	74	69	N. W.	"
12	70	71	70	"	"
13	69	70	70	N.	"
14	69	70	69	"	"
15	69	72	71	N. E.	"
16	71	72	73	N.	cloudy.
17	72	77	74	S. E.	"
18	71	75	73	S. W.	"
19	72	75	75	N. E.	"
20	72	74	73	S. E.	fair.
21	73	76	75	S.	rain.
22	73	74	75	S. W.	fair.
23	74	76	76	"	cloudy.
24	72	71	70	N. E.	rain.
25	69	71	70	"	cloudy.
26	70	74	71	N. W.	rain.
27	71	73	72	S. W.	cloudy.
28	72	74	69	N.	rain.
29	60	74	63	"	cloudy.
30	62	66	68	S. W.	"
31					
				Total No. of degrees.	

ABSTRACT FOR THE QUARTER.

MONTHS.	THERMOMETER.									WINDS.								WEATHER.			
	Highest degree.			Lowest degree.			Mean temperature			Hottest Day.	Coldest Day.	N.	N. W.	N. E.	E.	S. E.	S.	S. W.	W.	Prevailing.	Fair.	Cloudy.	Rain.	Snow.	Prevailing.
	VII.	II.	IX.	VII.	II.	IX.	VII.	II.	IX.			Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
JULY.		92		69			77	86	79	27	12	7	3	5		3	5	6	1	N. E.	13	10	7		fair.
AUGUST.		89		72			77	83	78	11	27	5	2	5	10	2	4	3		E.	22	7	2		fair.
SEPTEMBER.		86		60			72	75	74	2	29		3		4	3	5		2	N.	13	10	7		fair.

From the [British] Quarterly Journal of Agriculture.

ON THE POINTS BY WHICH LIVE-STOCK ARE JUDGED.

By Mr. James Dickson, Cattle-Dealer, Edinburgh.

Were an ox of fine symmetry and high condition placed before a person not a judge of live-stock, his opinion of its excellencies would be derived from a very limited view, and consequently from only a few of its qualities. He might observe and admire the beautiful outline of its figure, for that might strike the most casual observer. He might be pleased with the tint of its colors, the plumpness of its body, and the smoothness and glossiness of its skin. He might be even delighted with the gentle and complacent expression of its countenance. All these properties he might judge of by the eye alone. On touching the animal with the hand, he could feel the softness of its body, occasioned by the fatness of the flesh. But no man, not a judge, could rightly criticise the properties of an ox farther. He could not possibly discover, without tuition, those properties which had chiefly conduced to produce the high condition in which he saw the ox. He would hardly believe that a judge can ascertain, merely by the eye, from its general aspect, whether the ox were in good or bad health;—from the color of its skin, whether it were of a pure or cross breed;—from the expression of its countenance, whether it were a quiet feeder;—and from the nature of its flesh, whether it had arrived at maturity or no. The discoveries made by the hand of a judge might even stagger his belief. He could scarcely conceive that that hand can feel a hidden property,—the touch,—which of all tests is the most surely indicative of fine quality of flesh, and of disposition to fatten. It can feel whether that flesh is of the most valuable kind; and it can foretel the probable abundance of fat in the interior of the carcass. In short, a judge alone can discriminate between the relative values of the different points, or appreciate the aggregate values of all the points of an ox. The parts of the ox by which it is judged are called "*points.*"

We have thus seen that a person even totally ignorant of cattle may judge of some of the most apparent properties or points of a *fat* ox; but were a *lean* ox placed before him, he would be quite at a loss what opinion to pass on its present, and far more of its future condition. The outline of its figure would to him appear rugged and angular, and consequently coarse. To him the body would feel a number of hard bones, covered with a tough skin and coarse hair. A judge, on the other hand, can at once discover the good or the bad points of a lean as well as of a fat ox; because the properties of the former are the same in kind, though not in degree, as those of the latter: and, in accordance with the qualities of these points, he can anticipate the future condition of the lean ox, save and excepting the effects of accidents and disease.

But, it may be asked, if a judge of cattle is a character so easily attained as is here represented, how is it that the opinion of a judge is always held in deference, and is always referred to in cases of difference of opinion? This question admits of a very satisfactory answer. Errors in the judging of cattle arise not so frequently from not knowing the points to be judged of, as from judges allowing one or more of their favorite points the power

of too great an influence over the future increasing condition of the ox; and as long as there are so many points to be considered, and as most of them may be partially altered by local circumstances, a difference of opinion may exist among judges of lean stock.

Now, what are those *points* of an ox, a thorough knowledge of which is so essential to constitute a perfect judge? Could they be described and illustrated with such precision, as that they may be applied at once to every ox, in whatever condition it may be, a great advancement would be made towards establishing fixed rules for the right judging of all the domestic animals. Fortunately for the suppression of human dogmatism on this subject, nature herself has furnished rules for ascertaining points for judgement, which can only be discovered by long and constant practice. Nevertheless, I shall endeavor to describe them plainly, and after perusing the description, I hope my readers will perceive that they are established laws of nature; and are therefore unerring and applicable to every species of cattle. Like other phenomena of nature, a knowledge of them can be acquired by observation. This knowledge is the most difficult which a farmer has to acquire, inasmuch as the management of live-stock is a much more difficult branch of husbandry than the cultivation of corn. And although the importance of this knowledge is acknowledged by every experienced farmer, and a desire for its acquirement is strongly felt by every young one, it is remarkable that very little is said in professed works on agriculture on those rules which guide us in judging of fat or lean live-stock.

The first *point* to be ascertained in examining an ox is the *purity* of its breed, whatever that breed may be. The ascertainment of the purity of the breed will give the degree of the disposition to fatten in the individuals of that breed. The purity of the breed may be ascertained from several marks. The color or colors of the skin of a pure breed of cattle, whatever those colors are, are always definite. The color of the bald skin on the nose, and around the eyes, in a pure breed, is always definite, and without spots. This last is an essential *point*. When horns exist, they should be smooth, small, tapering, and sharp-pointed, long or short, according to the breed, and of a white color throughout in some breeds, and tipped with black in others. The shape of the horn is a less essential point than the color.

Applying these marks on the different breeds in Scotland as illustrations of the points which we have been considering, we have the definite colors of white and red in the short-horns. The color is either entirely white or entirely red, or the one or the other predominates in their mixture. The skin on the nose and around the eyes is uniformly of a rich cream-color. The Ayrshire breed in its purity is also distinguished by the red and white color of the skin, but always mixed, and the mixture consists of spots of greater or smaller size, not blended together. The color of the skin on the nose and around the eyes is not definite, but generally black, or cream-colored. In other points, those two celebrated breeds differ from one another more than in the characters which I have just described. In the West Highland, Angus, and Galloway breeds, the color of the skin is mostly black in the animals of the purest blood, although red, dun, and brindled colors, are occasionally to be seen among them. The black color of the skin of the nose and around the eyes is indicative of the pure blood of black colored cattle, but a cream-colored nose may frequently be observed among the other colors of skin. It would perhaps be hazardous to assert, in the case of the West Highlanders, that the characters above given are the only true indications of the pure breed, for their origin cannot now be certainly determined; but the characters given will certainly apply to the purity of the blood in the Short-horn and Ayrshire breeds.

The second *point* to be ascertained in an ox is the form of its carcass. It is found, the nearer the section of the carcass of a fat ox, taken longitudinally vertical, transversely vertical, and horizontally, approaches to the figure of a parallelogram, the greater quantity of flesh will it carry within the same measurement. That the carcass may fill up the parallelogram as well as its rounded form is capable of filling up a right-angled figure, it should possess the following configuration. The back should be straight from the top of the shoulder to the tail. The tail should fall perpendicularly from the line of the back. The buttocks and twist should be well filled out. The brisket should project to a line dropped from the middle of the neck. The belly should be straight longitudinally, and round laterally, and filled at the flanks. The ribs should be round, and should project horizontally, and at right angles to the back. The hooks should be wide and flat; and the rump, from the tail to the hooks, should also be flat and well filled. The quarter, from the itch-bone to the hook, should be long. The loin bones should be long, broad, and flat, and well filled; but the space betwixt the hooks and the short-ribs should be rather short, and well arched over with a thickness of beef between the hooks. A long hollow from the hooks to the short-ribs indicates a weak constitution, and an indifferent thriver. From the loin to the shoulder-blade should be nearly of one breadth; and from thence it should taper a little to the front of the shoulder. The neck-vein should be well filled forward, to complete the line from the neck to the brisket. The covering on the shoulder-blade should be as full out as the buttocks. The middle-ribs should be well filled, to complete the line from the shoulders to the buttocks along the projection of the outside of the ribs.

These constitute all the *points* which are essential to a *fat* ox, and which it is the business of the judge to know, and by which he must anticipate whether the lean one, when fed, would realise. The remaining points are more applicable in judging of a lean than a fat ox.

The first of the *points* in judging of a *lean* ox, is the nature of the *bone*. A round thick bone indicates both a slow feeder, and an inferior description of flesh. A flat bone, when seen on a side view, and narrow, when viewed either from behind or before the animal, indicates the opposite properties of a round bone. The whole bones in the carcass should bear a small proportion in bulk and weight to the flesh, the bones being only required as a support to the flesh. The texture of the bone should be small-grained and hard. The bones of the head should be fine and clean, and only covered with skin and muscle, and not with lumps of fat and flesh, which always give a heavy

headed dull appearance to an ox. The forearm and hock should also be clean and full of muscle, to endure travelling. Large joints indicate bad feeders. The neck of an ox should be, contrary to that of the sheep, small from the back of the head to the middle of the neck. The reason of the difference, in this respect, betwixt the ox and the sheep, is, that the state of the neck of the ox has no effect on the strength of the spine.

A full, clear, and prominent eye is another point to be considered; because it is a nice indication of good breeding. It is always attendant on fine bone. The expression of the eye is an excellent index of many properties in the ox. A dull heavy eye certainly indicates a slow feeder. A rolling eye, showing much white, is expressive of a restless capricious disposition, which is incompatible with quiet feeding. A calm, complacent expression of eye and face is strongly indicative of a sweet and patient disposition, and, of course, kindly feeding. The eye is frequently a faithful index of the state of the health. A cheerful clear eye accompanies good health; a constantly dull one proves the probable existence of some internal lingering disease. The dulness of eye, arising from the effect of internal disease, is, however, quite different in character from a natural or constitutional phlegmatic dulness.

The state of the skin is the next *point* to be ascertained. The skin affords what is technically and emphatically called the *touch*,—a criterion second to none in judging of the feeding properties of an ox. The touch may be good or bad, fine or harsh, or, as it is often termed, hard or mellow. A thick firm skin, which is generally covered with a thick set, hard, short hair, always touches hard, and indicates a bad feeder. A thin, meagre, papery skin, covered with thin silky hair, being the opposite of the one just described, does not, however, afford a good touch. Such a skin is indicative of weakness of constitution, though of good feeding properties. A perfect touch will be found with a thick, loose skin, floating, as it were, on a layer of soft fat, yielding to the least pressure, and springing back towards the fingers like a piece of soft, thick, chamois leather, and covered with thick, glossy, soft hair. Such a collection of hair looks rich and beautiful, and seems warm and comfortable to the animal. It is not unlike a bed of fine soft moss, and hence such a skin is frequently styled "mossy." The sensation derived from feeling a fine touch is pleasureable, and even delightful, to an amateur of breeding. You cannot help liking the animal that possesses a fine touch. Along with it is generally associated a fine symmetrical form. A knowledge of touch can only be acquired by long practice; but, after having acquired it, it is of itself a sufficient means of judging of the feeding quality of the ox; because, when present, the properties of symmetrical form, fine bone, sweet disposition, and purity of blood, are the general accompaniments.

These are the essential points of judging lean cattle; but there are other and important considerations which must claim the attention of the judge, in forming a thorough judgement of the ox.

The proportion which the extremities bear to the body, and to one another, is one of these considerations. The head of the ox should be small, and set on the neck as if it appeared to be easily carried by the animal. This consideration is of great importance in showing cattle to advantage in the market. The face should be long from the eyes to the point of the nose. No face can be handsome without this feature. The skull should be broad across the eyes, and only contract a little above them, but should taper considerably below them to the nose. The muzzle should be fine and small, and the nostrils capacious. The crown of the head should be flat and strong, and the horns should protrude horizontally from both sides of it, though the direction of the growth from the middle to the tip varies in the different breeds. The ears should be large, stand a little erect, and so thin as to reflect the bright sun-light through them. The neck should be light, tapering from the front of the shoulder and neck-vein, with a gradual rise from the top of the shoulder to the head. The length of the neck should be in proportion to the other parts of the animal; but this is a non-essential point, though I would prefer an apparently short neck to a long one, because it is generally well covered with the neck-vein. A droop of the neck, from the top of the shoulder to the head, indicates a weakness of constitution, arising frequently from breeding too near akin. The legs below the knee should be rather short than long, and clean made. They should be placed where they apparently bear the weight of the body most easily, and they should stand wide asunder. The tail should be rather thick than otherwise, as thickness indicates a strong spine and a good weigher. It should be provided with a large tuft of long hair.

The position of the flesh on the carcass is another great consideration in judging of the ox, the flesh on the different parts of the ox being of various qualities. That part called the spare-rib in Edinburgh, and the fore and middle ribs in London, the loins, and the rump or hookbone, are of the finest quality, and are generally used for roasts and steaks. Consequently the ox which carries the largest quantity of beef on these *points* is the most valuable. Flesh of fine quality is actually of a finer texture in the fibre than coarse flesh. It also contains fat in the tissue between the fibres. This arrangement of the fat and lean gives a richness and delicacy to the flesh. The other parts, though not all of the same quality, are used for salting and making soups, and do not fetch so high a price as the parts just described.

A full twist lining the division between the hams, called the "closing," with a thick layer of fat, a thick flank, and a full neck-vein, are generally indicative of tallow in the interior of the carcass; but it frequently happens, that all these symptoms of laying on the internal fat fail. The disposition to lay on internal fat altogether depends on the nature of the individual constitution; for, it is often observed, that those individuals which exhibit great fattening *points* on the exterior, do not fill with internal fat so well as others which want these points. On the contrary, thin made oxen, with flat ribs, and large bellies, very frequently produce large quantities of internal fat.

The first part which shows the fat in a feeding ox, is the point or top of the rump, which, in high-bred animals, is a prominent point; sometimes it protrudes too much, as the mass of *fat* laid on these is out of proportion to the *lean*, and therefore useless to the consumer. This is the part which frequently misleads young or inexperienced judges in the true fatness of the ox, because fat

may be felt on this part, when it is very deficient on most of the other points.

The parts, on the other hand, which are generally the last in being covered with flesh, are the point of the shoulder-joint, and the top of the shoulder. If these parts are, therefore, felt to be well covered, the other and better parts of the animal may be considered ripe. Ripeness of condition, however, can only be rightly ascertained by handling, for there is a great difference between the *apparent* and *real* fatness of an ox. The flesh of an apparently fat ox to the eye, may, on being handled by a judge, feel loose and flabby; but a truly fat ox always feels "hard fat." With such the butcher is seldom deceived, while loose handlers give no assurance of killing well.

It is proper, in judging of the weight of a fat ox, to view his gait while walking towards you, which will, if the ox has been well fed, be accompanied with a heavy rolling tread on the ground. In this way a judge can at once come very near to its weight.

The application of all these rules and considerations to the judging of *lean* stock, constitutes the chief difficulty to the judge. An ox, in high condition in so far as its condition alone is under consideration, can be judged of, as we have seen, by any one; and sometimes the fatness may be so great as obviously to deform the symmetry to any observer. The superiority of a judge to others, in these cases, consists in estimating the weight, observing the purity of the blood, and valuing the points of the animal. But in judging of a lean ox, its future condition and symmetry must be foreseen. The rules which I have attempted to describe, will, if studied practically, enable an inquiring observer to foresee these points; and in judging between a number of valuable points, it should be remembered, that purity of breeding will always insure aptitude to fatten, which, in its turn, will insure the largest remuneration for the food consumed.

Sheep, both fat and lean, may be judged of by nearly the same rules. The purity of breeding will be seen in the large full prominent eys, the clean thin bone of the head and legs, and the large thin pricked up ears, set on each side of the top of the head, and in the short, thick, smooth, clear hair of the face and legs. The section of the form of the fat sheep is even more mathematically like a parallelogram than that of the fat ox. The touch of the skin is also the same in kind, and is as sure an indication of the disposition to fatten as in the ox. In regard that wool varies so greatly in the many breeds of sheep, I can only make this general remark on the fleece best suited to every breed, namely, the whole body should be well covered with wool, with the exception of the face and legs, which are always covered with hair. A large covering of wool, not only protects them against the inclemencies of the weather, and the coldness and dampness of the ground, but it supplies a large fleece to be disposed of to the wool buyer. One deviation from the rules of judging cattle, must be made while judging sheep, to which I have already alluded, namely, while the neck of the ox should be thin, that of the sheep should be thick; because a thin necked sheep is found to possess a weak spine, and is generally a bad feeder. A thin neck has thus the same effects on sheep that a small tail has on cattle. As in cattle, a drooping neck in sheep indicates a weakness of constitution, arising from breeding in and in.

Some of the rules for cattle and sheep are applicable to swine. Swine should have broad straight backs, round ribs, thin hair, thin skin, small tails, short and fine muscles, pricked ears, small and fine bones, and round and well turned shoulders and hams.

In conclusion, it is obvious that these rules for judging live-stock are not founded upon arbitrary assumptions. Had no *natural* means of judging existed, man could no doubt have contrived rules to suit his own convenience; and in such a case, he would probably have chosen such as he could have most easily applied; but unless they could be applied to the *growing*, as well as the *mature* condition of animals, they would be of little value. But we have seen that natural means of judging *do* exist, and although they cannot be easily undersood without much observation and practice, yet, by practice, they can be acquired, and easily applied to the existing circumstances of the animal, whatever these may be. Any person, it is true, cannot at once perceive that their necessary tendency is to lead to a correct judgement. Long and careful personal observation is requisite to convince the mind of their value in that respect. Tuition, without practical observation, cannot of itself do it. It has been the study of nature, in short, which has enabled man to establish these rules for his guidance; and as all the operations of nature are regulated by general laws, these rules must be of universal application. It is clearly established by observation, as an uniform principle of judgement, that when an ox, in a growing state, presents a certain degree of purity of breeding, a certain form of body, and a certain kind of handling of its skin, a certain result is undeviatingly exhibited in the mature state from these given premonitory symptoms. Should this result conduce to the acquisition of wealth, we are anxious to possess the growing animal which exhibits such favorable points; and, on the other hand, we are as anxious to avoid the possession of that animal which exhibits unfavorable points, unless at a very depreciated value. Now, it has been ascertained by experience, that pure breeding, perfect form, and fine touch, make the best mature animal. Hence *these points* will insure both the growing and the mature animal a ready market and a good price; and hence also, that breed which constantly presents these points, deserves, by its intrinsic worth, to be generally cultivated.

From the New England Farmer.

CUT AND UNCUT POTATOES FOR PLANTING.

Mr. Fessenden—The following details of an experiment to ascertain the relative advantage of planting cut or uncut potatoes is at your service for publication if you think it of sufficient importance.

I planted this year alternate rows of cut and uncut potatoes. I put four pieces into each hill of the cut potatoes and two potatoes into each hill of the whole potatoes. The hills were three feet apart, each way, and of course the number of hills in an acre was 4840. The produce of the rows, planted with cut potatoes was at the rate of three hundred and fifty-five bushels the acre, or twenty-

three thousand five hundred and twenty pounds. The produce of the rows planted with whole potatoes was at the rate of four-hundred and fifty-eight bushels or thirty-two thousand and sixty pounds. The difference in the crop in favor of whole potatoes was at the rate of one-hundred and twenty-two bushels the acre, but as there were twenty-two bushels more of seed the acre used in planting the whole potatoes the nett gain was only one-hundred bushels. However, as one bushel of potatoes at the season of planting is usually worth two bushels at harvest time, it will be more accurate to calculate the gain at seventy-eight bushels. The kind of potatoes planted was the "*white blue nose*" which is decidedly the best potato for the table I have ever cultivated, though a moderate bearer unless it receive generous treatment.

Ellsworth, (Me.) 3*d Nov.* 1834.

For the Farmers' Register.

PETITION FOR AN AMENDMENT OF THE LAW RESPECTING ENCLOSURES, ON MARGINS OF THE NAVIGABLE TIDE WATERS OF JAMES RIVER.

[Lest it should be supposed that the appearance of the following petition indicates some opposition to the former one asking for a more general change in the law of enclosures, it is proper to state that the two petitions originated with different persons, and in distant parts of the country—and though without concert, and asking for relief in different modes, the two petitions, so far from being in conflict, will serve to aid each other's object. Public notice was advertised of the intention of offering this petition, some months before the publication of the other.]

To the General Assembly of Virginia.

The petition of the subscribers respectfully showeth:

That your petitioners are owners or occupiers of land lying on, and partly bounded by, the navigable tide waters of James River, or some of its tributary streams.

That in addition to the hardship and injustice which, in common with most of our fellow citizens, we suffer from the general operation of the law respecting enclosures, (which general hardships we do not mean here to discuss,) your petitioners are subjected to other and peculiar injuries, from which they may be easily secured by legislative interposition, without any loss or disadvantage to the community in general, and without inflicting wrong on any individual citizen whatever.

That by the existing law, the navigable rivers and their creeks and tributaries, however wide and deep, are not *legally* a barrier against the trespasses of live stock from neighboring lands—and therefore that the water boundaries of farms must be kept covered by a "lawful fence," or the owner of the land be subject to suffer, without redress, any extent of depredations from mischievous animals.

The great width of the Lower James River makes it in most places, an actual and sufficient obstruction to the crossing of animals—and therefore the land owners may, and often do, dispense with fences along the shores, by making "water fences" jutting into the river, or creeks, to such distances as circumstances require and permit. But these jutting fences are not only very expensive and difficult to construct, and to secure from destruction by storms, but they are not legal substitutes for complete enclosures, and he who uses them does so at his peril—and he can have no redress for any depredations of animals trespassing on a field fenced partly in this manner, because it is not under a "lawful enclosure."

But greater evils are felt where the waters, though deep, are more narrow. There also, generally, all stock, except hogs, are effectually kept from passing, by the miry nature of the bottom and margins of the creeks. But hogs cannot be stopped by these obstacles, nor by any depth of water, nor even by a considerable width, as well as depth: and if a field of 100 acres was thus exposed to the encroachment of a single hog trained to mischief, there would be no legal remedy, or safeguard, except fencing the whole water line.

The fences thus required by the law along the margins of rivers and navigable creeks, are by far the most expensive in our part of Virginia, where fencing has become generally a most burdensome tax on agriculture. The adjacent lands in almost every case are divested of all timber suitable for fencing, which makes it necessary to bring it from distant places: most of the water lines are marshy, or otherwise not easily accessible to carts: and withal so crooked as often to need fences of double the length of straight courses: and after being constructed at such great expense, fences in these places are immediately and always in danger from storms, high tides, and the concealed attacks of mischievous hogs, or their owners who may desire to profit by such depredations.

If there was any compensating benefit (by whomsoever it might be received) for all the waste of fencing along the borders of deep tide water, we should hesitate to ask your honorable body for this boon, however great its value would be to us. But in fact, the granting of our prayer for relief will encroach on no man's rights, and scarcely in the slightest degree on any one's interest, whether that interest be in the use of his own, or of his neighbor's fields. The scanty supply of food obtained by live stock along the margins of rivers and creeks, and from which they might be debarred by the desired change in the law, is scarcely worth as much as the expense and risk incurred by stock being allowed to range at large in such places: and the whole profit thus derived from stock, is certainly not equal to the tenth part of the expense of the fencing which is now necessary for gaining that profit, and for no other purpose.

We therefore pray of your honorable body that the general provisions of the law passed at the last session, which makes the Upper Appomattox a lawful fence, may be extended to all parts of the tide waters of James River, its creeks and tributary streams, navigable by vessels drawing four feet depth of water—and that "stops," or "water fences," under proper regulations, may be made lawful fences between the adjoining lands, on the same side of a water course.

All which is respectfully submitted.

OBSERVATIONS AND QUERIES RESPECTING ARTESIAN WELLS.

To the Editor of the Farmers' Register.

William and Mary College, Nov. 18, 1834.

The process of boring for water which of late years has been practiced with so much success in many parts of Europe and this country, has furnished scientific inquirers with an opportunity of verifying one of the most important truths which modern investigation has disclosed. I allude to the existence of very intense heat at great depths in the earth, and the progressive diminution of temperature in approaching the surface. This view of the interior condition of the globe, though by no means of modern origin, has, until a comparatively recent time, been deservedly classed with the thousand other speculations concerning our planet, to which the ingenuity and eloquence of theorists have given temporary celebrity. But in the present day, the doctrine has assumed a more imposing attitude. Even in its reference to the entire mass of the earth, it is sustained by the concurrent evidence of a multitude of facts, while so far as it relates to depths which observation has *actually explored*, it has acquired the character of *established truth*.

It is now very generally admitted, that the temperature of the earth, at great depths, is much higher than at the surface, and that the increase begins to be perceived as soon as we penetrate below the limit at which external impressions of temperature become insensible. The numerous observations which have been made of late years in the mines and Artesian Wells of Europe, have not only established the general fact of an increasing temperature, but have determined for many places in Great Britain and on the Continent, the precise depth at which the augmentation begins, and the rate of increase which subsequently occurs. But as yet I believe no observations of a similar nature have been made in this country, though the number and depth of our Artesian Wells would seem naturally to invite attention to the subject. In Western Virginia, Alabama, and some of the Northern States, this investigation might be carried on with great success. Nor should it be objected, that these researches are only matters of scientific curiosity, and that they cannot be subservient to any useful purpose. Much that is valuable might flow from a careful examination of temperatures and other circumstances connected with our Artesian Wells. Discoveries bearing upon the economy of these wells have actually attended such researches in some parts of Europe, and there are doubtless others still to be achieved. Nor is it unreasonable to expect even useful lights in *agriculture* from an accurate investigation of the temperatures of the superficial strata of the globe. Already observations of an analogous nature have disclosed the curious and important truth that in high latitudes the near temperature of the earth is less diminished than that of the atmosphere, and hence Wahlenberg, and after him Kuppfer, have explained the fact that many deep-rooted plants and trees attain a vigorous growth in situations where, from the general coldness of the air, it would be thought impossible for them to exist.

In the hope that some of your readers either in our western counties, or in Alabama, may be induced to institute observations on the salt wells or other borings, as well as the ordinary springs in their vicinity, I have drawn up a list of inquiries, embracing several subjects to which their attention might be advantageously directed. It will be seen that only part of these relate to the *temperature* of the wells. The others refer to various points of examination either interesting on account of their probable bearing upon the former, or from their own intrinsic importance in a scientific, as well as practical point of view. In connection with the enumeration of these several points of inquiry, directions and explanations are added for the benefit of the observer, together with such facts, derived from observations abroad, as are likely to furnish a guide to researches in our own country. The subjects to which I would here solicit investigation are embraced in the following queries.

1. What is the general temperature of the ordinary springs in the vicinity?

In reference to this query I would remark, that in comparing the temperatures at different depths in the earth with the temperature at the surface, it is necessary that the *mean temperature* of the surface should first be ascertained. To do this with great accuracy requires a series of observations with the thermometer, continued for many years, and made at short intervals. But as this could not in general be expected, an approximation may be obtained. by observing the temperature of the springs, in the neighborhood, particularly, such as issue from a considerable depth. Of course, much caution will be necessary in the selection of springs for observation, and in some districts it will be almost impracticable to find any whose temperature would correspond to the mean of that at the surface. Such a difficulty, for instance, would occur in some neighborhoods among our mountains, where mineral springs of various temperatures abound. But even there the freestone and limestone springs which have obtained their steady temperature by percolation through the superficial strata of sandstone and calcareous rock, would generally furnish a very close approximation to the mean. In less broken regions, where the springs are fed from deep strata of gravel, sand, and clay, their temperature is uniform throughout extensive districts, and approaches very nearly to the mean of superficial heat. Of course, such springs as will give this mean, must preserve their temperature unchanged throughout the year. If, therefore, observations made at different seasons, indicate any considerable variation in the temperature of a spring, no exact inference as to the mean can be deduced from a single observation. But if the variation be very small, as for instance, one or two degrees at opposite periods of the year, the mean may be very closely approached by taking the average or half-sum of the two extreme temperatures. Indeed, this method might frequently be resorted to with advantage, as a substitute for numerous atmospheric observations. As the impressions of external temperature travel downwards at a very slow rate, we should not expect to find even comparatively superficial springs promptly sympathising in the changes that occur above. Moreover, as these impressions grow fainter in their progress through the earth, and at length become entirely imperceptible, the fluctuation of temperature in springs even at a depth of twenty feet will present but a small fraction of the corresponding variation at the surface. It appears therefore, that

a few observations, made upon springs, will be of greater use in determining the mean annual temperature of a place, than a great number, made in the ordinary way, by exposing the thermometer to the air. In reference to this topic, it may be remarked, in conclusion, that the determination of this mean is far from being unimportant to the agriculturist; for it contributes a large item to his knowledge of *climate*, and as we all know climate is continually influencing the results of his operations, and should be thoroughly understood, to secure them the highest attainable success.

2. What are the general features of the surrounding country?

3. What rocks show themselves in the neighborhood, and how are they disposed? If, inclined, in what direction do they dip?

4. Through what strata does the well or boring penetrate, and what is the thickness of each stratum?

The investigations here suggested, though destitute of any immediate practical use, of which the farmer might avail himself, are, nevertheless, of a nature to interest him from the light which they may throw upon the origin and peculiar character of the springs and Artesian Wells in his vicinity. In a geological point of view, they are of the utmost importance, and such is the growing connection between *geology* and *agriculture*, that whatever promotes the one must either now, or at some future day, contribute to the advancement of the other.

5. To what height does the water rise in the well, and is its height uniform or fluctuating? If the latter, in what conditions of the weather, or other influencing circumstances, does it rise and fall?

6. What is the character of the water? Is it like that of the common springs in the vicinity, or, if not, in what respects is it peculiar?

7. Is any gaseous matter discharged with the water? If so, what is its nature?

A chemical analysis of the gas thus evolved, would not, in general, be practicable, but the determination of one or two of its most obvious properties would not be attended with any great difficulty, and might suffice to determine its nature. Thus its *odor*, if it possess any, its effect upon a lighted taper, its absorbability by cold water, and its effect upon the color of a slip of paper moistened with a solution of sugar of lead, would be matters of very ready observation.

8. What is the temperature of the water at the surface, and at successive depths of 50, 100, 150, &c. feet?

Allusion has already been made to the interesting fact of an increased temperature at great depths below the surface of the earth. This increase, as was before intimated, does not begin until we pass the limit at which the impressions transmitted from the surface become insensible. Of course, the distance of this limit from the surface, will vary with the nature of the intervening strata, being greatest always in those soils which most readily transmit the temperature from above. According to the observations which have been continued for the last fifty years in the caves beneath the Observatory in Paris, the temperature at the depth of eighty-three feet, has, during this long period, remained perfectly uniform; being by the Centigrade scale, 11.82 degrees or 53° 27 by that of Fahrenheit.

Comparative observations at depths of from one to fifteen feet, have been made at Edinburgh, Strasburg and Zurich, and the mean temperatures at these depths ascertained for each month in the year. From these it would appear, that even at the depth of a few feet the annual variation of temperature is very much reduced. Thus at Edinburgh, the mean temperature of the hottest month by a thermometer in the air, being 59° 36, and that of the coldest by the same instrument 38° 3, the corresponding mean temperatures at the depth of eight feet below the surface were respectively 50° and 42°—thus giving for the annual variation on the surface 20°, and for that at eight feet below only 8°. Again at Strasburg, the warmest month having a mean of 62° 6, and the coldest of 28° 4 at the surface—these means at the depth of fifteen were respectively 52° 8 and 43° 8—giving an annual variation at this depth but little exceeding one-fourth of that at the surface.

In looking over these observations, it is interesting to remark the successive arrival at a given depth of the impressions of temperature from above, *long after these impressions have declined or ceased upon the surface.* Thus, even at the depth of eight feet, the highest temperature is not experienced until September, and the lowest until February. Winter and summer, as it were, arriving a month or more after they have occurred above.

It is obvious from these statements, that changes of season become imperceptible at a comparatively small distance beneath the soil, and that the climate of the earth at the depth of 50 or 100 feet is perfectly uniform throughout the year. Hence springs issuing from this region may be expected to present little or no variation in their temperature. Beneath the depth at which this uniformity first becomes manifest, it has already been said, that the temperature progressively increases as we descend. A statement of some of the evidences by which this curious law has been established, may not prove unacceptable or useless to such of your readers as are interested in the observations to which this communication particularly refers.

Gensanne, who was the first to experiment upon the comparative temperatures at different depths, obtained in the lead mines of Giromagny the following results.

At a depth of 101 metres the temperature was 12° 5 Centigrade,
206 " 13 1 "
308 " 19 0 "
433 " 22 7 "

Sanssure in the salt pits of Berne found at a depth of 108 metres, a temperature of 14° 4 Centigrade
183 " 15 6 "
220 " 17 4 "

The observations of Cordier, a celebrated French geologist, being among the most complete and satisfactory that have yet been published, may with propriety be here transcribed. They were made in the three great coal mines of Carmeaux, Littry and Decise, and the temperatures were obtained both from the rocks and springs at different depths.

Carmeaux.

	Depth.		Temp. Centi.
Water of the well Veriac,	6 2	metres	12° 9
Water of the well Bigorre,	11 5	"	13 15
Rock at the bottom of Ravin mine, - -	181 9	"	17 1
Rock at the bottom of Castillan mine, - -	192	"	19 5

Littry.

Surface, - -	0	"	11
Rock at the bottom of St. Charles mine, -	90	"	16 135

Decise.

Water of the well Pelisson,	8 8	"	11 4
Water of the Puits des Pavillons, - -	16 9	"	11 67
Rock in the Jacobè mine,	107	"	17 78
" " "	171	"	22 1

These observations were made with extreme care, so as to avoid the influence of all local causes that might vitiate the results.

To these might be added the numerous and accurate observations of Daubuisson in Saxony and Brittany—De Trebra in the former, and Fox in Cornwall. Our own continent has, as yet, witnessed but a single observation of the kind; one made by the learned and enterprising Humboldt in the silver mine of Guanaxuato in Mexico. This observation is chiefly valuable on account of the great depth at which it was made, viz: 522 metres, or nearly 1800 feet. The mean temperature at the surface being 60° 4 of Fahrenheit; he found the thermometer below to stand at the *enormous height of* 96° 44.

But the experiments bearing most directly on the query last proposed, are those which have been made in various Artesian Wells in Europe.

The following results were obtained by M. De Bellevue, in a well of this description on the sea side near Rochelle.

The well at the time of the first experiment was 3½ inches in diameter, and 316 feet deep; filled with brackish stagnant water to the height of 294 feet. The external air being at 51° Fahrenheit, the thermometer after remaining at the bottom 24 hours stood at 61°. At eleven feet below the surface the water had a temperature of 56° 6. The same well being afterwards sunk to 370 feet the thermometer, after standing 25 hours, showed a temperature of 64° 6; making an increase of 3° 6 for an additional depth of 54 feet. A repetition of the observations gave precisely the same result.

An Artesian Well in the neighborhood of Vienna gave the following temperatures.

Mean temperature at the surface.	50° 44	Fahr.
At a depth of 62 20 feet	52 25	"
do. 111 68 do.	52 90	"
do. 300 42 do.	56 93	"

Another at Epinay gave,

At the depth of 30 37 feet	51° 8	Fahr.
do. 177 76 do.	55 94	do.
do. 219 45 do.	57 20	do.

In these observations the depths were estimated in metres, and the temperatures measured on the Centigrade scale. I have reduced the former to English feet, and the latter to degrees of Fahrenheit, for the sake of a more convenient comparison, with observations which may hereafter be made in this country.

From a review of the observations above recorded, it will be apparent that although in every instance the temperature increases with the depth, the *rate* of this augmentation is not the same at different places.

The following table exhibiting the depth in English feet corresponding to a rise of one degree of Fahrenheit, has been calculated from the numbers given in Pouillet's Elemens De Meteorologie.

In France.

At Decise,	27 30	feet.
At Littry,	34 58	do.
At Observatory in Paris,	50 96	do.
At Carmeaux,	63 70	do.
At Brittany.	72 80	do.

In Switzerland.

Near Bex,	47 32	feet.

In Saxony.

The mean of several mines, 72 80 feet,

In England.

Cornwall and Devonshire,	45 50	feet.

In America.

At Guanaxuato,	45 50	feet.

In the Artesian Well near Rochelle, to which we have already referred, the rate of augmentation was still more considerable than in either of the above examples. There the thermometer rose 3° 6′ by an increase of depth amounting to 54 feet—which is at the rate of one degree to 15 feet.

Certainly no fact can be more curious or interesting than the comparatively high temperature of the water in the lower parts of these wells. From the known tendency of warm water to ascend and give place to that which is colder, it is evident that unless there existed some permanent source of heat at the bottom and sides of the well, the distribution of temperature which has been observed could not continue for any length of time—and hence these experiments furnish convincing evidence of a regularly augmenting temperature in proportion to the depth.

The observations hitherto made on the temperature of Artesian Wells, have, as we have already stated, been confined to Europe, and have embraced no very great range of depth. Many of the borings in the United States afford an opportunity of obtaining a much wider extent of comparison, and would therefore, no doubt, furnish still more interesting results. Assuredly this consideration ought to be sufficient to invite all who are favorably circumstanced to engage in the investigation. The time and labor necessary for such a course of observations, would be inconsiderable, when compared with the important bearings of the inquiry, and even supposing that a minute degree of accuracy should not be found practicable—great interest will attach to the rudest approximate result. The following hints as to the mode of observation will, it is hoped, be useful in furthering inquiry.

In order to discover the exact temperature of the water at any considerable depth, the thermometer which is let down ought, if possible, to be pro-

tected from the influence of the cooler water above, through which it must be raised at every observation. Otherwise, its temperature will fall as it is drawn up to the surface, and it will only indicate *in part* the heat that prevails below. One of the best means of preventing this effect, would be to enclose the instrument in a thick strong case of glass, and fill the vacant space around it with dry powdered charcoal or finely carded wool laid loosely in. The case should be so tight as to prevent the entrance of the water. But as a case of this description could not be readily obtained unless by special order at a glass house, a good substitute could be constructed by enclosing a hollow cylinder of baked wood in a water tight covering of sheet iron or lead. The wooden cylinder should have a top and bottom of the same material, the former capable of being screwed off and on. The metallic envelope should also have a moveable top, and should be so much larger than the wooden cylinder within, as to allow a packing of powdered charcoal between them. The thermometer, contained in the inner vessel, should be surrounded with a packing of the same material. Thus surrounded with a non-conducting envelope, the instrument would retain the temperature impressed upon it below, even though raised quite gradually to the surface. Of course, after letting it down to any particular depth, it should be suffered to remain in that position for a long time, in order to acquire the precise temperature of the surrounding water. It should then be drawn up as rapidly as convenient, and its temperature noted without delay. To avoid the necessity of opening the cylinders at each observation, for the purpose of observing the instrument, a part of the stem or scale might be allowed to project through one end, taking care that the perforation in the cylinder through which they pass is perfectly secured by cement against the admission of water. This arrangement, however, is by no means necessary, and would be difficult to make secure.

To those who are provided with a *Maximum Thermometer* these precautions would be unnecessary, for it is the property of that instrument to indicate by its gage or float, the *highest* temperature to which it has been exposed in observation, although the mercury in the stem may subsequently have been much depressed. With an instrument of this description, observations would be more accurate, and at the same time much more readily made than by any other arrangement that could be devised, and it would therefore be desirable that those who are about to enter upon experiments of this nature would provide a Maximum Thermometer for the purpose. The instrument can be procured in any of the large cities at a moderate cost, probably not exceeding five dollars.

A close approximation to the temperature might, I think, be obtained by enveloping the bulb in a thick covering of cement formed of melted rosin and bees wax, which, when cold, would form a hard covering, impervious to water, and having but little power to conduct heat. This method, I think, is well worthy of being tried.

Where there are several wells of different depths near each other, the *rate of increase* might be ascertained to a certain extent, by placiug the thermometer successively at the bottom of each well—but the results would be more satisfactory and complete if *progressive* experiments were made in each. Moreover, such experiments should be repeated several times, and the mean of observations taken.

9. In what way or according to what law does the strength of the water in salt wells vary with the depth?

This query which is addressed especially to the proprietors of our western salt works, has been in part suggested by a very curious fact mentioned by Alberti in a work published a few years ago on the rocks of Wirtembury. This author states that the brine *diminishes* in strength from the surface downwards to a certain depth, where it is almost in the condition of *pure water*, and that beneath this it grows stronger as you descend. The fact is extraordinary and almost incredible—yet it is asserted upon the authority of a great number of carefully executed observations.

The following table selected from a number of similar ones, will serve as an example of the seemingly inverted arrangement of the water in the upper part of the well, and of the regularly increasing strength beneath. The series of observations were made after the well had remained eight hours without being drawn upon. The unit of measurement referred to in the table is equivalent to three and a half English feet. I have not reduced the numbers to feet, because this would have rendered fractional qualities necessary in the columns expressing the depth.

Depth below the surface.		Per centage of salt.
16	measures	2½
17	do.	2¼
18	do.	2
19	do.	1½
20	do.	1
21	do.	¾
22	do.	½
29	do.	¼
47	do.	0
48	do.	0
49	do.	¼
54	do.	½
55	do.	¾
58	do.	¾
91	do.	1
92	do.	3
93	do.	7¼
94	do.	13
95	do.	19
96	do.	22
97	do.	23
98	do.	26
99	do.	27

In another series of observations upon the same well in different circumstances, the maximum strength of the brine, instead of occuring as in the above experiments at 47 or 48 measures below the surface, took place at the depth of 140 measures. The subsequent increase of saline impregnation was also a great deal slower, so that to reach brine of 27 per cent., it was necessary to descend to a distance of 197 measures.

The facts here stated possess the highest practical, as well as philosophical interest; but further experiments are wanting to determine whether in the numerous observations referred to by Alberti, the very singular results which he has recorded were produced by some general cause, or by peculiar circumstances of a local character. To

settle this important point, observations made in our western salt wells would be of the highest value. If a similar gradation in the strength of the brine should be found in them, a very striking proof would be furnished of the existence of some general law on the subject, with which the world has been hitherto unacquainted. It is hoped that such of your readers as are interested in the salt works of our Western Country, will at once recognise the importance of the inquiry, and will hereafter contribute to your pages the results of their observations on the subject.

WM. B. ROGERS.

[Before receiving the foregoing article, we had, with views to other objects, addressed some other queries on kindred subjects to a few friends residing in or near the "rotten limestone" region of Southern Alabama, which is supplied with pure water almost exclusively by deep Artesian Wells. They will here be stated concisely—and we add our request to that of Professor Rogers, that any of our readers who have it in their power, will obtain and communicate correct information on any one, or more, of the points on which it is desired.

Do many of the Artesian Wells in Southern Alabama reach water that rises to and flows over the surface, forming artificial, but permanent fountains? In such cases, with what force does the water burst out, through bores of specified diameters? What is the usual expense of the boring, according to the size of the auger used, and the depth reached? Is overflowing water reached on the elevated prairie lands, as certainly as on lower ground, and with what difference of depth, and of expense?

The main object (visionary as it may be) of these latter inquiries was to learn whether the remarkable and abundant supply of deep subterraneous waters in this region might not be used to provide for two of the greatest wants of its inhabitants, viz: water power to propel machinery, and streams for irrigation. The bald prairies, which are rendered barren by the excess of their calcareous ingredient, would be kept fertile by watering, and the whole of that prairie region may be greatly increased in value by the same aid, if it can be cheaply given. If we may rely on our few examinations already made of these prairie soils, they are calcareous in a very high degree—which quality serves to give present fertility, and *may also cause future sterility, if not guarded against by some care.* As to water power from an overflowing well—however feeble it may be through a small bore, where its passage is much obstructed, its force will be increased far more than merely in proportion to the increased size of the bore—and if the supply of water below is unlimited, so may be the water power thus obtained.

Readers who reside near any of the great and well known bodies of prairie land in the western states, will also aid us in these and other objects of inquiry by sending samples of soil from any of these prairies, of well known and remarkable qualities, whether fertile or otherwise. The land should be dry, (or not too wet for cultivation without draining,) and its character in all other respects be particularly stated in explanatory references to the samples of soil—such as the shape and exposure of the surface—degree of fertility—whether subject at any time to inundation from rivers—the names (whether common or botanical, or both) of the kinds of grasses which form the principal growth of the soils, &c. &c. Any such specimen may be sent to the editor by mail, and free of postage if the whole, with its envelope, does not exceed half an ounce in weight. When thus transmitted, the soil should be enclosed in a small bag of thin but strong paper, with the edges closed by paste.]

COMPARATIVE VIEW OF THE RIGHTS OF CITIZENS, AND OF HOGS, UNDER THE FENCE LAW OF VIRGINIA.

To the Editor of the Farmers' Register.

Fairfax County, Nov. 20, 1834.

I rejoice to have your able and industrious support in relation to that most odious law prescribing and defining what shall be a legal fence—or in practical plain common sense, what a man shall do before he can exclude others, and be authorized to say that the fruits of his land and labor are in a legal view his own. Yet, sir, strange and ludicrous as it is, though I can by law exclude my fellow man and fellow citizen, from "ranging" or passing over my land, under heavy penalties, and even send him to jail if he disregards the prohibition, I dare not, without incurring heavy penalties, exercise the rights and privileges of an owner towards horses, cattle, and hogs. They, like the king, or other great men, "can do no wrong." Is it not passing strange that the beasts of the field should have rights and privileges denied to man? I ask, sir, if it be not passing strange that the governor of Virginia has not the rights of a horse, a cow, or a hog? I pray you not to misunderstand me—I am serious: and I appeal to your statute book, and say that the governor dare not "range" my grounds, and yet his beasts can, and if I resist, and they are injured, wo be unto me in damages. As much as I respect the sanctifications of time, I blush to think that such a law has existence, and that it is thus saved from public scorn. It is absolute mockery to talk of a civilized society where the rights of person and property are not fully and perfectly protected by the law; and in perfect respect to the General Assembly, I must say that to give one the right of enjoying the property of another looks like outrageous injustice, and downright plunder.

JEREMIAH.

From the Philadelphia Inquirer.

RAIL ROAD RAPIDITY.

We stated on Friday that the Camden Company had actually run the whole distance from New York to Philadelphia in less than five hours—being at the rate of thirty miles an hour for that part of the route which is between South Amboy and Camden.

This is undoubtedly one of the most striking facts connected with the progress and growth of rail road travelling which has yet taken place in this section of the country. It shows what can be accomplished by science rightly applied. For while it is well known that several natural disadvantages impair the speed of the Camden and

Amboy rail road machinery—besides part of the distance—that between New York and South Amboy—being water carriage, and therefore slow in proportion, yet we see the two large cities of New York and Philadelphia now for the first time, brought within five hours of each other.

The whole distance by this route is ninety-four miles, being about ten miles longer than the route by the way of Trenton.

The Camden and Amboy Company has done well, and deserves the liberal patronage of the community. Judging also from what it has accomplished, we may be permitted to imagine what greater speed may be attained, on the opening of the Trenton route, which is only eighty-four miles long, and passes through the intermediate country without the curvatures, deep cuts, elevations or water sections, which necessarily impede the speed of the Camden and Amboy route. At the same rate of speed, the journey to New York by the Trenton route, may be travelled in about two hours and three quarters, but as the levels and directness are greater, it may be calculated on extraordinary occasions, at two hours and ten minutes.

This calculation may appear incredible to the public; but it will be found on a strict scrutiny to be based on mathematical accuracy. Ten years ago who would have supposed that in 1834, the distance between New York and this city would have been diminished to five hours? Yet so it was on Thursday.

We trust that with these facts before our public men, no impediments will be allowed to prevent the opening of all routes—but particularly the shortest, and most direct, between our large commercial cities. The growing population and intercourse of New York and Philadelphia will soon demand another route of communication. One will be insufficient for the purposes of trade and commerce, and we trust that no time will be lost in providing for the construction of the Trenton route especially. The opening of the new route will not in the slightest degree affect the interests, injure the prospects, or depreciate the stock, of the Camden and Amboy Company. It will only increase the number of travellers. The Camden and Amboy Company deserve well of the public—their arrangements are on the most liberal scale—their steam boats, rail road cars and so forth, of the most commodious character. They cannot be put down—there is no desire to injure a corporation that has conferred such important advantages upon the public; but at the same time, for the sake of fair competition and honest rivalry and general convenience, we earnestly trust that the New Jersey Legislature will act in a liberal and enlightened spirit, and sanction both routes.

From the Genesee Farmer.

ON ROLLING WHEAT.

Some farmers in this neighborhood, have given the finish to putting in their wheat by rolling the fields smooth; but my experience is opposed to this practice. For mowing indeed, the ground cannot be too smooth; and wheat that is well matted above and well rooted below, will doubtless be less affected; but late sown wheat that comes up through a smooth uniform surface, is much more exposed and injured by the sweeping winds than wheat that grows on ground left rough by the tracks of the harrow. The difference is very great; and if there should be any of your readers who doubt it, let them run the harrow in a few places across the rolled field, and observe the result next spring.

The best time for rolling wheat and preparing the ground for the scythe is in the spring.

A PLOUGHMAN.

BRITISH ASSOCIATION.

In the proceedings of the British Association at their recent meeting, (as reported in the Literary Gazette,) there is a complimentary notice of one of our young countrymen, Professor Henry D. Rogers of Philadelphia, who received his education at William and Mary College. The subject of the notice was a report on the geology of North America, which he (as a member of their Geological Committee) had been formerly required to prepare, and which was laid before this meeting. The British Association is composed of a numerous body of the most distinguished scientific and literary men, residents of every part of the civilized world—and this mode of combining their efforts for the advancement of science cannot fail to be attended by the best effects.

TO CORRESPONDENTS AND SUBSCRIBERS.

The following communications have been received: *On the injury to corn caused by gathering its fodder—General topics connected with agriculture, &c.—Address to the Agricultural Society of King William and King and Queen—Performance of a thrashing machine and wheat fan—On obtaining new and improved varieties of grain by crossing—On the rotation of crops, and the Pamunky plan of cultivating corn—Memoir on making the wine of Marsillac* (translation from the French)—*Short rules for tobacco planters—Some account of the travertine formation of the Sweet Spring Valley,* by Prof. W. B. Rogers—*On wine culture in the United States—Desultory remarks on the fermentation of putrescent manures—Querist—Address to the Agricultural Society of Fredericksburg—Queries on herds grass.*

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Most of the many errors which may have been observed in the long and interesting article on *Cotton*, in No. 6, were in the print from which it was republished. We are often placed in the like situation, and should not have made a remark on this occasion, but that the faults had been attributed by a friend (and very rationally) to our press. All publishers are more or less liable to charges of this kind, and we have doubtless enough such offences of our own to answer for, to be solicitous that those of others should not be added to the burden. We do not feel at liberty to alter the language of printed articles, for even gross and manifest errors, unless the proper form is equally evident. This is not the only occurrence which has required such explanatory remarks—and many others hereafter may render it desirable that our readers should remember the excuses now offered.

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